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BITS & BYTES

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HARDWARE

TOSHIBA T3100 – portability and power

TELECAT – purr...fecting A.T. compatability

SOFTWARE

Smartstuff

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– where's it heading?
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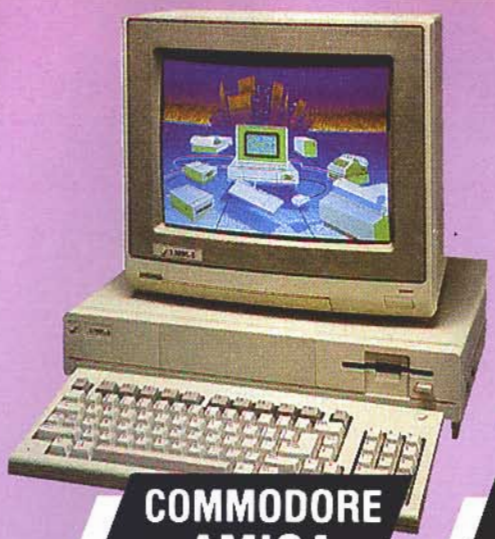
DATA TRANSFER

mainframe to mini – plain sailing?

PRINTER ROUNDUP Part 1.

PORTERFIELD



COMMODORE
AMIGA

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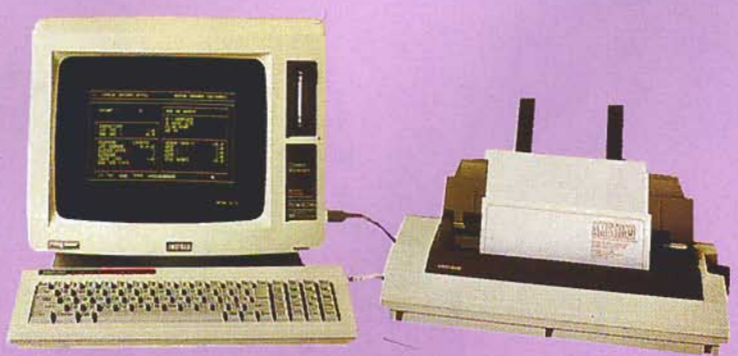

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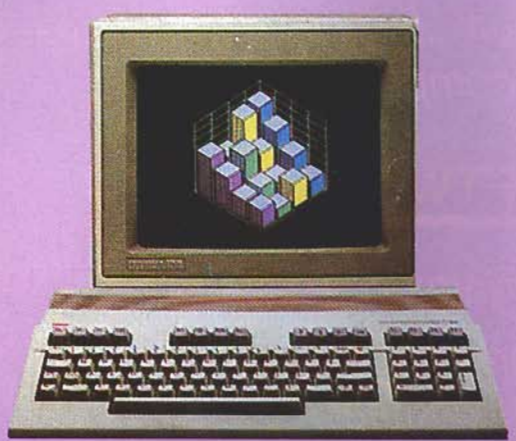

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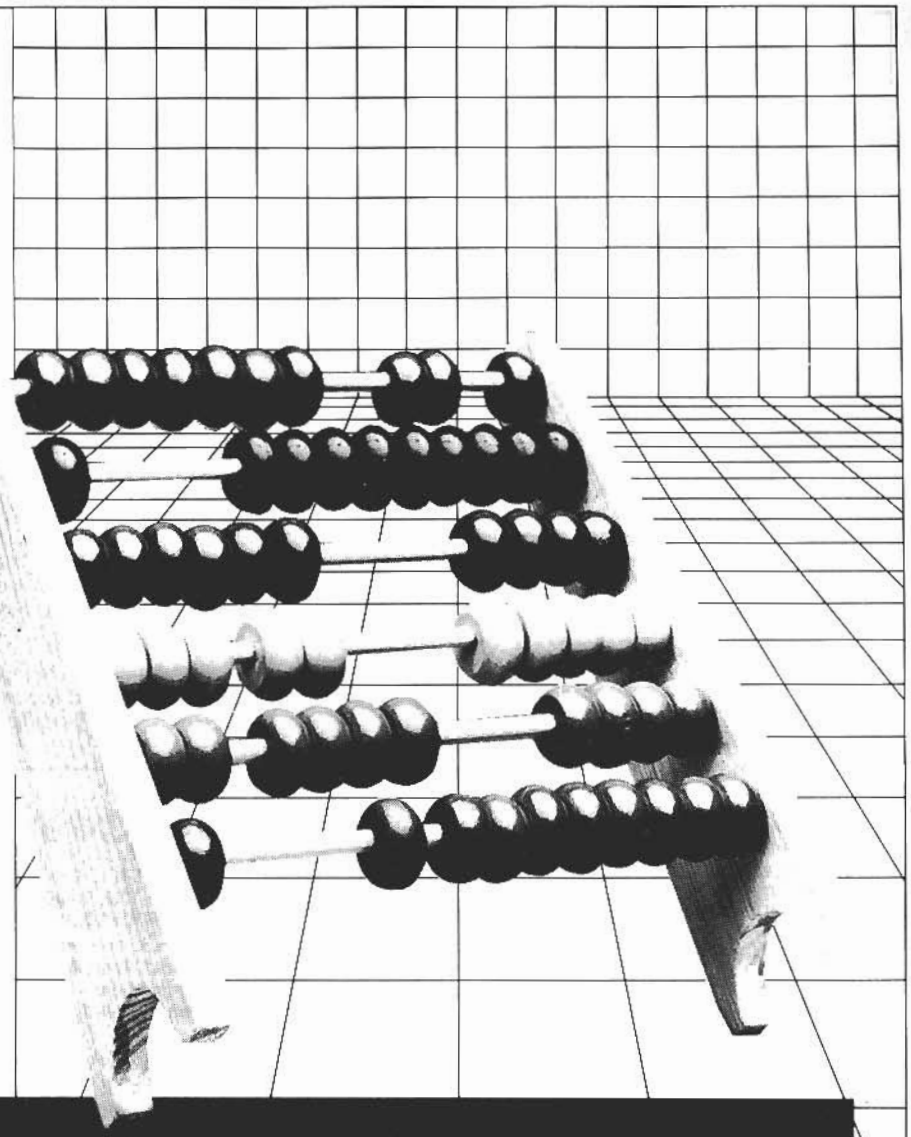
PORTERFIELD



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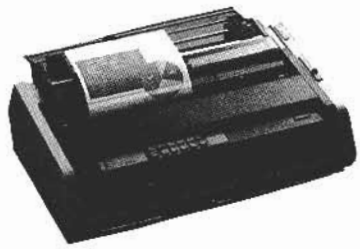
The TeleCAT-286



PRINTERS 1986
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HARDWARE REVIEWS

SOFTWARE REVIEWS

FEATURES

COLUMNS

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SUPPLY AND DEMAND

The word out there is that computer hardware is having supply problems. Dealers are having trouble obtaining sufficient numbers of machines to meet demands, and even some distributors are – guardedly – admitting there is a problem, while others say things are fine. What's the situation?

Where a problem exists, it seems to fall into either one of two separate categories – inaccurate forecasting of demand, or a supply bottleneck caused by the New Zealand operation being controlled from Australia. The distributors there, for reasons of their own, are slow or unwilling to acknowledge the demand from what might be regarded as a minor market. A third minor reason is that of limited credit resources of a company wanting to place a large order overseas, restricting the size of any one order.

Inaccurate predicting is what IBM admits is the situation with its PC Convertible, launched in this country a couple of months ago but not yet seen in any great numbers.

"There has been a supply problem," says Ray Harding, IBM's manager of external affairs. "The demand against the early forecast – which was strong – has been even stronger. The problem is not restricted to New Zealand, but we expect it to come into balance by the end of September."

IBM's objective is to have off-the-shelf supply, geared to the level of production, but it also acknowledges that overall assessment of the PC demand is made difficult by the success of the Convertible.

Comodore's problem, however, isthought by others to be linked to its relationship as a dealer with the Australian operation. "February is when we last had adequate supplies," according to Dick Anderson, managing director of Commodore Computer (New Zealand). "There have been financial problems overseas. Plants have been closed down in the UK and California, and the German production has been cut down. They've moved much of the manufacturing to the Far East."

While the Amiga is proving popular among the advertising agencies and others, supply has been restrained because of its popularity overseas, although that is thought to have been resolved. Much worse is the situation with the C-64, which has dried up altogether as Commodore has been tooling up for the new C-64C, internally the same as the old model but externally different.

"It's amazing how strongly the dealers have stayed with Commodore in spite of a rough ride," says Anderson.

Dealers, perhaps, but not necessarily the buying public. According to Bill Porter of Porterfield Computers, the shortage of Commodores has caught other suppliers out as people have been driven to other makes.

"There's been an unprecedented demand for computers in the last two months," he says. "That has led to some shortages and some delays, but the situation can change from day to day. I would expect another rush between now and Christmas, particularly October, as businesses haven't yet been organised for GST."

He also points out that while Amstrad has been satisfactory, it could have a shortfall, with the 6128 in particular, which will be filled from Australia at higher cost to keep the customers happy.

So some are having more problems than others. In such a competitive market, it would pay the distributors to keep a very close watch on the question of supply.

MoS TOP 10 P.C. Software

1. Lotus 123
2. Wordperfect
3. XTREE
4. PARADOX
5. dBase III+

MoS TOP 10 P.C. Software

6. Wordstar 2000+
7. Harvard Presentation Graphics
8. Perfect Writer
9. Microsoft Windows
10. IFPS/Personal

OCTOBER

Copy protection removed

Taking what it says is a "calculated risk", Ashton-Tate is removing copy protection on its software, including dBASE III Plus, dBASE III Plus LAN Pack and Framework II, and also from Javelin 1.1 which it markets.

The company says the non-copy protected software will be easier for users to install and make personal back-up copies, although it points out that the standard licensing agreement still stipulates that the software can be used by only one person at a time, and prohibits duplication of software for unlicensed users.

"The move will end problems with users inadvertently corrupting disks and being unable to use the software until a replacement is secured," says Ashton-Tate (New Zealand) managing director, Kerry Baillie.

He says copy protection will be removed for all users, not just corporate users, and upgrades to non-copy protected programs will cost about $100.

Seagate distributor

Hard-drive manufacturer Seagate (US) is now officially supported here by Christchurch-based Solstat Industries. This means warranties can now be supported locally.

The range is from 10Mb half-height drives to 96 Mb full-heights.

Solstat claims more PC importers will choose the option of importing PCs without drives and installing the Seagates offered here under warranty.

Solstat is buying direct from Seagate's Singapore factory and claims pricing advantages over competitors.

New range of compatibles

American Research Corporation, based in Los Angeles with its hardware manufacturing plant in Taiwan, is planning to extend its operation into the Pacific, starting with Australia and New Zealand where a distributorship is in the process of being set up.

Apart from the keyboard, all the hardware is made by ARC, and prices are expected to be "lower than IBM, but higher than normal Taiwan-sourced compatibles," according to Michael Gardner, ARC's product planning manager.

At the moment, four ARC machines are available: the turbo PC with 640 Kb RAM and 8088-2 processor; the 286 turbo, an AT based on the 80286 with 640 Kb or optional 1 Mb; and two versions of what ARC calls itss transportable, one stage up from luggable – The World, a small XT; and The World 286, an AT equivalent. All come with Microsoft and 1.2 Mb floppy drive, with 360 Kb floppy and 20 Mb hard drives optional.

Australian expansion

Calibre Group of Auckland, the distributor of TeleVideo hardware and microcomputer local area networks, has been bought by Impact Systems Ltd, the Australian laser printer manufacturer, as part of Impact's planned expansion programme into New Zealand, USA, UK and Europe.

Starting business in 1983 as Data Peripherals NZ Ltd with rights to market TeleVideo computers, Calibre focused its attention on local area networks, becoming NZ distributor of the Novell range of products.

In addition, Calibre has announced the introduction of the vLAN local area network for the IBM PC/XT/AT and compatibles. From NetWorth Engineering of Texas, vLAN was developed using Novell's operating system software, and is intended for small installations of two to eight workstations, but can be expanded to as many as 50.

Softmice

Software publisher Ashton-Tate is in the process of taking over Decision Resources Inc, the developer of the business graphics software packages, as part of its stated strategy of "having a range of market-leading software for IBM PCs and compatibles in all business applications".

In another direction, Ashton-Tate has announced the planned release in New Zealand next month of dBASE Mac, the rewritten version of its database management software dBASE III PLUS for the Apple Macintosh.

"It looks and acts differently from other dBASE products," says Kerry Baillie, managing director of Ashton-Tate (New Zealand), "and makes full use of the Macintosh mouse's 'point-and click' environment.

New distributorship for Imagineering

Imagineering Micro Distributors has signed an exclusive NZ distribution agreement with AST Research, the major add-on hardware company.

Founded in 1980 by three first-generation imigrants to the USA whose initials (Albert, Safi and Tom) gave the company its name, AST Research today numbers more than 800 people. Its management is presently looking at the possibilities of micro-mainframe connections, using any PC as a connection to IBM mainframes or minis.

"We have observed a large trend world-wide to do away with dumb terminals, since you can do so much more with a PC for the same price," said Peter Wagner, AST Research's sales manager for Africa and the Pacific when in this country recently to finalise details of the agreement. "Many or most corporations have both dumb terminals and PCs, so they may as well make them talk."

He believed the New Zealand market was closer to that in Australia than the US, mainly for exchange reasons, but pointed out that because of the expense, New Zealand users tended to squeeze the last drop of use out of their equipment. For that reason, reliable servicing was important.

The latest AST product to be distributed through Imagineering is 3G, a graphics board which combines monochrome, colour and extended graphics in one, for a price one-third more expensive then any one of the boards normally necessary for just one function.

Government Computing Service report

In the Government Computing Service's first annual report since it became an autonomous trading agency within the Public Service, revenue for the year ended March 31 totalled $59.3 million, an increase of 26 per cent on the previous year's earnings of the old Computer Services Division of the State Services Commission.

However, in real terms the revenue growth is said to be closer to 36 per cent, as the 1984/85 year included income from the MWD's Vogel House facility, which was transferred to the MWD on April 1 last year.

The GCS was formed in September 1985 following a State Services Commission-chaired review which led to freedom for permanent heads of departments to make their own decisions on where they would obtain their EDP services.

"It was set up as an autonomous agency, to concentrate solely on providing EDP services to clients rather than having to pass judgement on whether clients should have the services they were requesting," says Mike Foden, general manager of GCS. "At the same time, it was given the opportunity to extend its market beyond the public service if desirable and appropriate."

He forecasts total revenue for the current year will be $68 million, an increase of $8.7 million over 1985-86. The GCS will implement a capital expenditure programme of some $20 million this year, and expects payments to the government of more than $10 million to cover interest on debt, tax, and dividend.

AT released

NEC has released its APC-IV, another in the burgeoning range of IBM PC/AT compatibles, with standard 640 Kb RAM expandable to 10.5 Mb, and 40 Mb hard disk and 1.2 Mb floppy disk drives as standard.

A 640 x 350 pixel screen displaying 16 of a possible 64 colours is also standard with an optional 1120 x 7650 pixel power graphics display available. Both show the normal 25 x 80 characters.

NEC says the APC-IV costs less than the IBM equivalent, and spearheads its thrust into the corporate market.

Trade in software

In a move thought to be the first of its kind in New Zealand, the Auckland microcomputer software company Sybiz Distributors is offering 100 per cent trade-ins to dissatisfied users of rival software.

According to Sybiz general manager Lindsay Kirschberg, the offer is not intended as a sales gimmick, but as a positive gesture to help small businesses.

"So many of them, largely through inexperience, have purchased software which does not meet their accounting needs," he says, "that we have decided to help rectify the situation by offering them a trade-in up to the value of 1500."

As well as being inappropriate, many of the small businesses' accounting software is said to be outdated, lacking in vendor support, or not accommodating GST. The full trade-in on the old software will be subject to the purchase of a suite of Sybiz business accounting software, available only thorugh official Sybiz dealers.

IBM slow-down continues

"IBM's financial results reflect a continuation of the business slowdown in the North American economy that began in 1985," said IBM chairman John Akers when reporting the worldwide financial results for the six months ended June 30.

Worldwide nett earnings for the period were $2,322 million, down 3.2 per cent from the corresponding 1985 figure of $2,400 million. However, gross income of $22,395 million was up 5.6 per cent on the previous year's $21,203 million, with currency rates having a positive effect in countries outside the USA.

IBM New Zealand reported "strong financial results" for the 1985 calendar year and is experiencing continuing strong demand in 1986.

Wyse WY-60 terminal released

Imagineering Distributors has announced the release of the WY-60 which it describes as "Wyse's most powerful offering to date for the ASCII market".

The terminal features the choice of three keyboards: ASCII, IBM PC AT, or RT/316X; its 44-line capability and seven pages of screen memory provide users with more editing capability; and among other features is the choice of green, amber or white phosphor screens.

Imagineering Microdistributors says the Wyse 60 terminal will retail for $1620.

A smaller CAT

by Roy Purvis

TeleVideo Systems originally came into the New Zealand computer scene with a range of terminals, and later produced CP/M micros, pioneering the linking together of micros into local area networks. As the CP/M operating system declined with the advent of the IBM PC and its numerous variations, TeleVideo moved into that aggressive market, and has increased its product range in the area with the slump in the terminal market.

Among that range is a series of printers and, most recently, a competitively-priced AT compatible PC. While the TeleCAT-286 emanates from TeleVideo's own factory in South Korea and costs well under $NZ9,000, TeleVideo points out that its long-established (since 1970) history gives it a strong funding base and what it sees as an increasing share of the competitive New Zealand marketplace through the local distributor, Calibre Group.

So, then, to the newly-introduced AT with a small footprint.

First impressions

TeleVideo's TeleCAT-286 computer is a machine with style. It's compact, more so than a clone. It has a nice box and is obviously designed to sit on the desk top, looking about half the size of an IBM PC AT. The beautiful 14-inch green screen with matching styling can tilt and swivel, and although I've never been very keen on grey, perhaps it's the horizontal stripes that appeal.

However, when I turned it on I got that ghastly IBM lumpy type display, as it emulates the colour graphics card. It is possible to put it into a slightly better form of display because this is TeleVideo's own graphics adaptor which has high-resolution colour, monochrome, with monochrome grey levels emulating colours, but it seems that, like most do-anything systems, it doesn't do any one of those things very well. For example, it doesn't manage what a Hercules card does, which is an excellent monochrome display.

The TeleCAT-286 comes with three books, very good documentation in two parts – installation and user's manuals, filled with heaps of detail on how to set it up. I worked my way through this when setting up the hard disk and down-loading the operating system. It comes with PCDOS 3.1, GWBASIC with its own full documentation, and some TeleVideo utilities as well. The IDISK utility makes it very easy to work off the menu and set up the hard disk, partition it for more than one operating system, and other tasks.

Stop thinking PCs and start thinking Advanced Technology

One of the advantages of the AT is that more than one partition on the disk can be running different operating systems. By changing the active partition it's possible to change from one operating system to another.

The machine also runs Theos 286V, and Xenix System V should become available in the near future. Both these operating systems can use up to 16 Mb of memory.

I was a little bit lost when I couldn't see the light which shows when the hard disk is being accessed. Since it's also fairly quiet, it's a bit hard to know whether the thing is actually working or not. However, the DISK procedure was very easy to use. It gives a choice of interleaves, which is convenient because an interleaf of one is probably the quickest for a single user, while a multi-user system requires an interleaf of five or seven.

The hard disk is a half-height Seagate, with a fairly slow access time, which formatted out to 20.3 Mb. I found it interesting to note that it comes up with PCDOS 3.1, copyright to TeleVideo and Microsoft, with absolutely no mention of IBM there.

Inside the case

I took the cover off the machine to have a look inside at the physical equipment. It has two cards – the video and disk controllers – and three spare 98-way slots, with a system board which can slide out of the case, even though it goes underneath the

drive and power supply. The board contains the 80286 processor, with 512 Kb of RAM in 256 Kb chips, and the memory can be expanded to 1 Mb on the system board, but at more than 640 Kb there has to be software that will talk to it.

To get the commpact size, the TeleCAT-286 has its half-height hard disk standing on its edge. The floppy drive is a high-density type, storing 1.2 Mb of data, and is also two-speed which allows it to run at 300 rpm to read standard PC 40-track 360 Kb disks. In high-density mode the disk rotates at 360 rpm as in 8-inch drives, and has twice the data packing density with 80 tracks.

The mode command is a useful utility, enabling many system parameters to be set up through a simple menu, such as the parallel ports, serial port parameters, and changing the screen operating mode. It also includes a test pattern which can be thrown up on the screen in order to align the display, along with the choice of colour, pseudo-colour, monochrome, 40 or 80 columns, etc. (The IBM colour graphics adapter was originally designed to work with 40 columns because it's a 320 x 200 pixel screen.)

DISPLAY	CGA	MONO	TeleCAT extended	Hercules	EGA
pixels H x V	320x200	640x200	640x400	720x348	640x350
colour	4-colour	green	green or 16-colour	green	16 or 64 colour
Char. block	4 x 8	8 x 8	8 x 16	9 x 14	8 x 14

This might be a good point to go into screen displays and the formats that are happening in the AT theme. What has basically been done here is that TeleVideo has taken the standard low-resolution IBM colourgraph mode (320 x 200) and doubled it, giving a 640 x 400 display with an 8 x 16 pixel block for characters in 16 colours. Alongside that is the Hercules graphics card with monochrome 720 x 358 pixel display and the enhanced graphics adapter card which adds colour with the 640 x 350 pixel resolution, 16 or 64 colours. This allows an 8 x 14 dot matrix for each character, which is really the IBM high-resolution colour standard.

Keyboard

Anyone used to a *PC* keyboard should enjoy the TeleCat keyboard because of its large return key and a generally uncluttered appearance. I gave it a touch-typist who rattled along at 100 wpm and pronounced it to be satisfactory for typing on. Average pressure is required on the keys, and the Caps and Num locks have small green lights in them for easy identification when they are in operation. A tilt function allows the keyboard to be angled for comfort, and it's excellent – everybody should have a keyboard like this.

And how does the TeleCAT-286 perform? If you're used to working on a PC, you'll love it. The 80286 is a true 16-bit processor, and the architecture of this machine has a 16-bit data path, 24-bit address path, allowing it to process very quickly. Norton tells us that this processor is 7.3 times faster than a PC, and I don't really see why people should buy a PC XT for business use, when a low-cost version of an AT like the TeleCAT-286 is available for around $8,700.

The table shows some benchmark tests I ran, and it came up as quite a

	IBM PCAT	TeleCAT –286	Sperry IT	ITT Xtra	Altos 586	Units
Norton	5.7	7.3	8.3	8.6	n/a	PC=1
Primes	1.0	1.36	1.43	1.64	0.65	AT=1
IBCbench	357	278	249	256	464	Second

good machine, a little bit faster all round than the IBM PC/AT which was running at 6 MHz as opposed to the 286's 8 MHz. The three-part performance test relates to five machines, all with hard disks. It should be noted that although the TeleCAT is switchable at 6 or 8 MHz, all my tests were run at 8 MHz.

Another point to remember is that a simple sequential read of the hard disk is twice as fast as on a PC XT machine, so both processing and disk access are faster than a PC's, good for productivity in a work situation.

What does it mean? The prime number and Norton tests relate really to pure CPU throughput and memory access time, which would show up for example when doing a recalculation on a spreadsheet, while the access time for a sequential read is really the time for loading and changing programs. The average seek time in this drive is about 65 milliseconds, not as quick as most ATs, and this would show up where a lot of random records have to be read, as tested by IBC Bench. That is designed to test a machine's ability in a multi-user situation where a lot of processing, serial input-output and disk access is going on.

The machine scores quite well there, a little slower than the Sperry IT (an 8 MHz processor with no wait-states on memory access, as well as having a slightly quicker disk drive access time). Overall, the TeleCAT-286 is significantly quicker than an IBM PC/AT and lightning when compared with a PC.

In summary, it is a very fast PC to put on a desk. It is also a work station when linked into a much larger computer through the unbuilt serial port with suitable terminal emulation and file transfer programs, and it can also work as a multi-user machine. The 80286 processor, remember, was originally designed to operate in a multi-user environment, and the Theos operating system allows access to up to 15 Mb of memory through eight serial ports by way of something like an Arnett card. Three or six users can be run on this machine, but any more than that and I think it would be too slow. It depends on the application programs being run, but at a guess I would rate this as a three-user machine with excellent performance.

Options and add-ons

The only option available from TeleVideo is a 30 Mb disk drive instead of the 20, but it must be remembered that this has an AT bus. The three spare expansion slots are standard 98-way AT types, so other things such as the serial ports, memory cards and alternative video cards can be plugged in there, while an EGA card would also drop in.

The TeleVideo standard video card will run either a colour screen in low-resolution colour graphics adapter type mode, or TeleVideo's own 640 x 400 mode, but this is only applicable when running TeleVideo's operating system.

A similar thing happens with the disk controller. It seems they have a quick disk controller with some buffer in it, but in order to run other operating systems it needs to have a standard Western digital type disk controller installed. Novell network cards can also be installed, and the three expansion slots are 16-bit buses, full-length slots.

So – take it away, all you dealers and programmers. Stop thinking PCs and start thinking Advanced Technology.

I'm sure we're going to see a lot of ATs like this (a low-cost version of an AT), as well as the super-fast higher-priced 80286 machines in the Sperry IT and the ITT Xtra range, and we will start to have some real programming power.

To anybody who thinks he or she can run multi-user on an ordinary PC, I would ask, "Why bother?" An 8088 has only an 8-bit data path and is a much slower processor. Down the road, maybe, somebody will come up soon with a 32-bit machine, but in the meantime we have a low-cost high-power computer in the TeleCAT-286 which should find many users in business applications. ☐

(Review machine supplied by Calibre Group, Auckland.)

SPECIFICATIONS	
Name	TeleCAT-286
Make	Televideo Systems Inc.
Processor	Intel 80286
Clock	8 MHz with one wait state RAM
ROM	BIOS and self test 32KB
RAM	512 KByte 150nS
DISK	20.3 MByte hard disk; optional 30 Mbytes; HD floppy drive 1.2MB.
In/Out	Async serial port 9-pin; parallel printer port; video for mono or RGB VDU; 3 AT expansion slots; Built-in speaker
Display	14-inch green screen; 640x400 pixels; optional 16 colour display
Keyboard	Querty keys + numeric pad; + 10 function keys
Dimension	400 x 420 x 160 (WxDxH)
Power	230 Vac 140 Watts
Bundled Software	PCDOS 3.1 and GWBASIC
Price	$8695; +$1000 for colour screen; + $260 for Western Digital disk controller (required for Xenix and Theos)

UNIX: A powerful can of worms

by Mark James

When UNIX System V was unveiled three years ago, AT & T accompanied it with a massive publicity campaign that ran under the slogan, "From now on, consider it standard". The following year Multi Solutions, the developers of the S1 operating system, responded with a series of articles entitled "UNIX: From now on, consider it dead". Nothing could better reflect the two attitudes that systems people hold regarding UNIX. You are either a religious convert or a saboteur.

UNIX is, of course, neither standard nor dead. It is one of the most flexible operating systems ever designed. There are at least five incompatible versions of UNIX, and many more look alike systems. UNIX is capable of doing almost anything, slowly. It is as powerful, and as friendly to use, as a cobra snake. It is a system programmer's dream, but it is not catching on in business.

It is difficult to understand the beast without knowing its history. UNIX was created in the late 1960s as the in-house operating system of Bell Laboratories, the giant research institution attached to the American telephone monopoly, AT & T. The name UNIX is actually a play on the name MULTICS, one of the most advanced operating systems of the 1960s, in whose design the Bell engineers also had a hand.

At the time, UNIX was far and away the most radical computer software in existence, not only in its design but also, especially, in its politics. That fact goes a long way towards explaining the cult following that UNIX quickly built up; this was, after all, the 1960s. The most radical feature of all was UNIX's portability.

For heavy database operations, get a horse

Operating systems had always been the private preserve of the hardware manufacturers, and were generally written in the machine code of the computer. No two computers' operating systems were compatible; and the hardware manufacturers took advantage of this fact to "lock" their users into one brand of computer.

Those who resented this situation tried repeatedly to devise a portable operating system, one that would run identically on several different

brands of computers. Most of these efforts failed because the computer manufacturers were not interested in supporting standards. Thus when word got out that the Bell engineers had achieved, by themselves, a portable operating system, the cult of UNIX was born.

UNIX is an operating system designed by programmers, not by computer manufacturers

Today, of course, many operating systems claim portability; each of the multi-user systems that we have considered in this column is portable to a degree, and some are much more so than UNIX. Nonetheless, the pride of being first belongs to UNIX, and it is still far and away the most widespread of the portable systems.

Another UNIX innovation that has been widely copied (by MS-DOS, among others) is the hierarchical filing structure. Under other systems each user had his or her own directory of files; no one, except a hacker, could gain access to anyone else's files. Under UNIX, sub-directories can be nested within directories. The resulting hierarchy of files reflects the organisational structure of a place like Bell Labs, where departments are divided into projects, which are in turn subdivided into teams.

Pipes and shells

UNIX is an operating system designed by programmers, not by computer manufacturers. As such, it provides a program development environment that is difficult to imitate on other operating systems. Two features of this environment are pipes and shells.

In UNIX jargon, an executing program is called a "process". A pipe is a means whereby the output from one process can be used as the input to another. These processes manipulate files, and under UNIX, everything is a file; not only data files, but also programs, directories, terminals, printers, plotters, even other computers, are all treated as "files" by UNIX. A pipe can connect a process to a file, or to another process.

The fluid that flows through the pipes is mostly commands. A process may be started up, for example, by a user typing a command at the screen, or by another process piping that same command to the command interpreter. In either case, the command interpreter receives the command from a pipe; it doesn't matter whether the pipe is connected to a screen or to a process.

The command interpreter itself is called a shell. The shell is actually just another process and if you have the source code, you can modify or even completely rewrite it. Since it is the shell that provides the interface between UNIX and the user, a system programmer can totally change the way UNIX looks to the user, simply by implementing another shell. Most versions of UNIX allow multiple shells to run concurrently.

To a programmer, then, UNIX is close to ideal. The kernel of the operating system chugs away in the background, scheduling processes and managing the pipes and files. The programmer controls everything else through the flexibility of the pipes and the power of the shells.

Unfortunately, what is ideal for a programmer is not always best for the end user. The price that UNIX pays for its power can be measured on three scales: compatibility, efficiency and friendliness.

Friendliness and efficiency

The standard shell that comes with UNIX is called the Bourne shell after its creater, Steve Bourne. Most of the UNIX commands and utilities were designed with the Bourne shell in mind. The problem with the Bourne shell is that it is horrible to use for anyone who doesn't know UNIX well.

The shell commands appear to have been designed by someone who took a sadistic delight in ambiguity. The command cat looks as if it should give a catalogue or directory listing. Not true; cat is short for concatenate, and it displays the contents of files, like the LIST command in BASIC. What that has to do with concatenation is not immediately clear. The command ls, short for list, looks as if it should do the same thing, but no, it gives directories. The pwd command means not "change password" but "print working directory"; mv means rename, not move.

Sinister-looking commands like grep, uucp and yacc explain, in part, why UNIX has never had much appeal to non-technical people. Of course, UNIX gurus can (and do) modify or even scrap the Bourne shell in favour of a more friendly interface. Alternative shells can also provide other features useful to the non-programmer, such as decent password protection, friendly error messages and multi-user database features like record locking and selective backup.

One problem here, however, is that processes written for one shell will not necessarily function properly if their pipes are connected to a different shell. This is at the root of many of the incompatibilities between the various flavours of UNIX and UNIX-like systems.

A related problem is that UNIX marketers who dare tamper with the Bourne shell risk the wrath of the UNIX faithful, who will become understandably upset if their yaccs and greps stop working. The only way around this limitation is to have two shells in the system, or three, or four. The UNIX kernel, already an overworked animal, now has to support more shells and more pipes, and quickly becomes the bottleneck for the whole system.

MULTI-USERS

The irony is that UNIX, the programmer's utopia, starts to break down in terms of efficiency and friendliness as soon as someone else tries to use the products of that utopia. The efforts of dozens of UNIX software houses to resolve this problem have only resulted in more versions of UNIX.

Flavours

AT & T has released, at various times, four different official versions of UNIX: Version 6, Version 7, System III and System V. Each of these has had various sub-verions. In addition, the University of California at Berkeley has distributed its own enhanced flavour of Version 7. Each of these versions has been issued to many UNIX licencees, who generally implement the system on one or more machine types. Not all of the implementations correspond precisely to the UNIX specification, and not all of the licencees have bothered to upgrade whenever AT & T comes out with a new release. Some regard the Berkeley version as superior to AT & T's own. Many have implemented their own shells, or built interfaces to their own proprietary operating systems.

On top of this, several software companies have developed operating systems that copy many of the features of UNIX, and are marketed more or less as UNIX clones. In the microcomputer world, the two most popular of these are Coherent, from Mark Williams, and Idris, from Whitesmiths. These operating systems are not licensed by AT & T, but generally take their inspiration from one or more of the standard UNIX versions.

As a result, UNIX is not really one operating system. It is dozens of them, a real can of worms. These systems all have certain areas of compatibility, such as the Bourne shell commands, but there are also broad areas like communications and C-language library calls where nearly every system is different. UNIX has thus lost some of the portability and hardware independence that once set it apart.

Micro UNIX

Except in comparison to the older, lumbering mainframe operating systems, UNIX cannot be considered very efficient. The overhead involved in supporting pipes, shells and multiple processes is often too much for a microcomputer to handle. It is no accident that the great majority of UNIX sites in New Zealand are running on supermicros (like Altos and Stride) or larger computers.

Recently, however, UNIX has become a more practical option for micros. Few machines now are sold with less than 256K in them, and memory upgrades are cheap, so that UNIX's memory-hungry kernel has some room to manoeuvre. The price wars on IBM PC/AT-type machines have brought powerful systems with hard disks within reach of mere mortals. (A hard disk is essential for UNIX, which does no disk caching.)

AT & T sells something called a UNIX PC, which implements UNIX System V, but by far the most popular form of UNIX on microcomputers is Microsoft's XENIX system, because it runs on IBM PCs. XENIX began as an adaptation of the Berkeley flavour on microprocessors, but later versions of XENIX have conformed to System III and, most recently, System V. The XENIX version used on the low-end Altos computers is System III, while that used on the newly-released ITT Xtra XL is System V.

Even although XENIX was designed for microcomputers, it is not practical to run it as a multi-user system on anything less than a PC/AT-type machine. Even those PC/AT-type computers which cater directly to the XENIX markets often make use of special hardware to attempt to improve system response times. For example, the ITT Xtra XL boasts very fast hard disk drives and a multi-port serial controller that performs direct memory access to the computer's memory, thus reducing the number of interrupts. from the users' terminals.

The need for such advanced hardware to strengthen the system's disk and terminal management illustrates a central problem with XENIX, and with microcomputer UNIX in general. In its efforts to be a universal operating system, in the flexibility and modularity inherent in its pipes, and in the adaptability of the shells, UNIX has given itself a lot of overhead. It is a powerful but slow-moving system. VAX users might not notice; micro users will.

Although the hardware is now available, on a micro level, to handle the UNIX overhead, one could always wonder whether it would be better to run another multi-user system on that same (or cheaper) hardware. The answer, of course, depends on the kind of work intended for the computer. For software development particularly in the C language, it would be difficult indeed to find a better environment than UNIX. For heavy database operations, get a horse.

In other words, programmers, engineers, hackers and computer hobbyists will be among those most likely to consider UNIX standard, while others might be forgiven for thinking it was dead. ▢

Pop-up office DeskTools

by Shane Doyle

Smartstuff is another collection of DeskTool programs from FBN Software, the people who gave us SmartKey. As with other PC DeskTool products, you can choose to use all or only one of the programs, depending on available system resources and your requirements.

Smartstuff offers eight DeskTools – standard full function calculator, extended financial and statistical calculator, calendar, alarm clock, DOS command accesser, modem phone dialler, word processor, and a program that allows you to run another application program as a DeskTool.

All these programs take up memory of course, and to use the whole collection will chew up around 195k absolute minimum, while more memory will be used by installing various load time options. It is recommended that the required DeskTools be loaded from the AUTOEXEC.BAT file, and if you do not use this file, a further program is provided to create it for you from a simple choice menu.

Any DeskTool is called up (invoked) by holding down the ALT key and pressing on another key, eg ALT/A for alarm clock, ALT/W for word processor. If you are using an application program that uses the same ALT key sequence, then the keys need to be pressed twice. The first time calls up the Smartstuff module, and the second is passed through to the application program. If this is still a problem, the invocation key sequence may be user defined by a load time parameter.

Each DeskTool can be repositioned on the screen and appears in the same position each time it is invoked. I liked this as I get annoyed at pop-ups that appear in different locations each time they are invoked. Most of the DeskTools offer menu bars and function keys to select their functions, and also have an online HELP function.

Briefly, the functions of the individual DeskTools are as follows. SmartAlarm is quite useful, offering six alarms with individual messages and a snooze facility, an event timer stopwatch, optional on-screen time display and hourly time signals. Standard daily alarm settings may be entered into a file which is then read at prognam load time. A feature called "time feed" allows the clock to pass a message back to DOS or other application program. This can be used to run programs, print documents or perform other functions while you are away from the machine. Finally, the date and time can be "stamped" onto the application program.

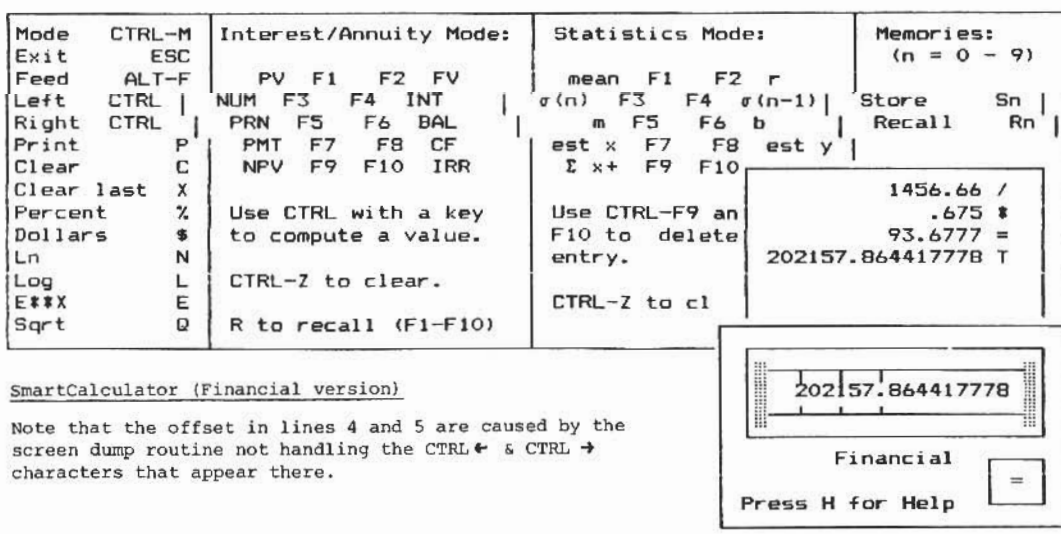
SmartDos gives access to the most commonly used DOS commands while working in the application program. These commands are DIR, XDIR (a utility that displays the first few lines of a file), CD, DEL, COPY, REN, TYPE and CHKD. There is also a most useful little PRINT function, offering a menu to set standard IBM compatible printer options – emphasised, compressed, etc.

Additional to this menu is a facility to allow you to send printer control code sequences direct to the printer, giving a handy basic feature printer setup program, always available. Another useful feature is the Typewriter mode that allows you to place an envelope into the printer and type an address directly onto it.

A detailed month display with daily messages can keep track of recurring events

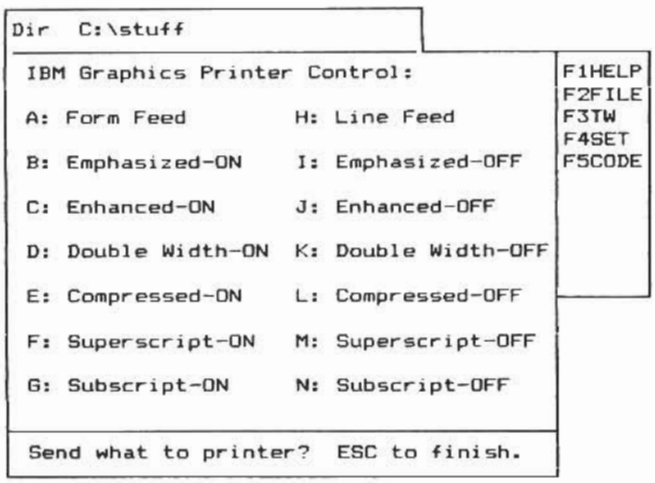
SmartCalculator has fairly standard functions, but offers 10 memories and an on-screen "tape" that records all calculations and scrolls up the screen. This tape can also be printed out. I found the calculator totally useless, as are all on-screen calculators – it is far quicker to use the real thing. The only use I have ever found for an on-screen calculator is for decimal/binary/hex conversions and binary/hex calculations. SmartCalculator does not have these features.

Probably of more use would be the extended financial and statistical calculator, as this provides a host of financial calculation and statistical analysis functions. It includes such mystifying beasties as "Depreciation by Sum-of-the-Year's Digits Method" and "Calculating the Slope and Intercept of a Regression". There are too many to list here, but I am sure most of these functions would be used at one time or another.

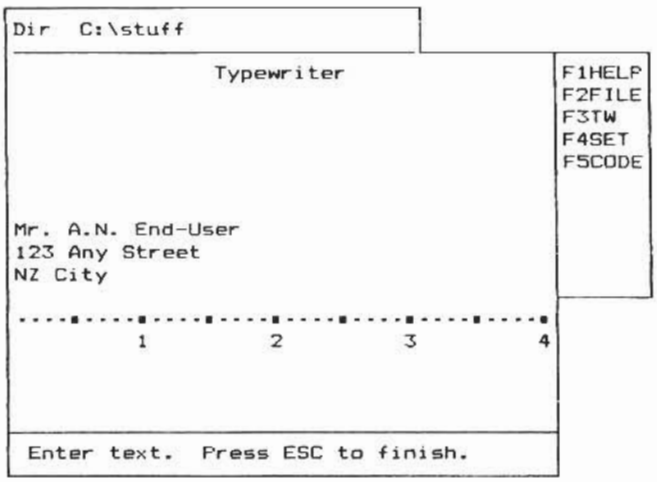


SmartCalculator (Financial version)

Note that the offset in lines 4 and 5 are caused by the screen dump routine not handling the CTRL← & CTRL → characters that appear there.



SmartDos PRINT function - showing printer setup menu.



SmartDos PRINT function - showing "Typewriter" function.

SmartCalendar I also found useful, and I thought the display formats were better than others I have seen. On invocation a three-month calendar is shown: previous, current and next. As with other similar products the cursor keys move the calendar back and forth in time. A detailed month display with daily messages can keep track of recurring events and the calendar can be printed out.

I was unable to test the SmartDial program as the modems I use do not have the AutoDial facility. Before using the program a setup utility is run to create a configuration parameter file. SmartDial can be used to dial a number for an ordinary voice call, and can also dial a number from SmartWord's address book.

The SmartWord text editor/word processor is the most complex of the DeskTools and as with other like products, uses the WordStar control key commands. It features margin settings, wordwrap, search and replace, and text block manipulation. The program also interfaces to SmartDial via an address/phone number file and to SmartClock via an appointment scheduler.

Notepads or documents can be saved to disk using any legal DOS filename, and as the files are standard ASCII text files they may be imported into other word processors' documents. Text can be cut and pasted between SmartWord and other applications programs, and in fact I found the "screen grabbing" feature easier to use than in rival products.

The final DeskTool, SmartAny, can be quite useful as it effectively allows you to call up one application program while working in a second. For example, you may be working in a database and wish to use your word processor without exiting the database. Pressing ALT/F10 will "pop-up" the word processor just as though it was another DeskTool.

Text can be cut and pasted between SmartWord and other application programs

Smartstuff joins a small group of similar DeskTool products, each of which has strengths and weaknesses. For anyone looking for a pop-up DeskTools suite for the office PC, then I recommend a serious look at Smartstuff, as I feel it is better suited for end-user requirements. From a software developer's point of view, however, it is not quite as useful as one or two of its rivals. ☐

(Review copy supplied by Computer Store, Milford, Auckland)

Analysing your spreadsheets -painlessly

by Dennis V. Lally

The two software products which have made the microcomputer the powerful and indispensable tool that it is today are the spreadsheet and the word processor.

The word processor has allowed unparallelled power in expressing and manipulating the written word. Text can be hammered out in spontaneous style with little heed for errors in typing or spelling because these things can always be tidied up later. Whole blocks of writing can be shunted about, cut up, inserted, deleted, repeated and formatted with consummate ease. Useful utilities like spelling checkers highlight glaring errors and ensure that the final printed product is an impeccable exhibit of justification and proportional spacing.

The spreadsheet can fairly lay claim to even nobler achievements. Whereas the word processor has simply improved upon the typewriter, the spreadsheet has ushered in a new era in dealing with the quantitative environment (or in other words, just about everything around us!).

Not so long ago we, and all our ancestors, merely counted. Then new hand-held appliances appeared which allowed us to calculate. Now the microcomputer teamed with a spreadsheet allows us to crunch numbers, to sum vast fields of data and to build formulas which look to other formulas which rely on further formulas to look up tables of calculated data and perform functions which we never did quite understand in high school algebra.

We now use spreadsheets to test options, describe 'what if' scenarios and ultimately to make decisions. In a very short time we have become dependent on the spreadsheet and reliant on its power to handle complex relationships of data. In fact, the spreadsheet has unleashed us into considering complex financial relationships which could never have been entertained in paper and pencil days. It can breed a tangled web of numerical undergrowth which somehow produces the results we expect and trust to be right.

Or does it?

Like the spelling checker in a word processor, a good spreadsheet package will warn you of errors and prevent obvious mistakes. Unlike a word processor, however, the product of a spreadsheet cannot be easily judged. No word processor can disguise a badly written memo full of grammatical errors and nonsense. On the other hand, a spreadsheet could look right and even test out as precise on known data, but imbedded in some obscure cell reference could be a fatal relationship that will create wrong results.

... complex financial relationships which could never have been entertained in paper and pencil days

Truly sinister

It is bad enough to have doubts about the integrity of a spreadsheet you design yourself, but things truly become sinister when the PC honcho in your department leaves and no one can understand the intricacies of the complex spreadsheets he created when someone else tries to adapt one. It is always a good policy to document spreadsheets and name every range and link every relationship, but it is also very time-consuming and a section of a large sheet could still evade description.

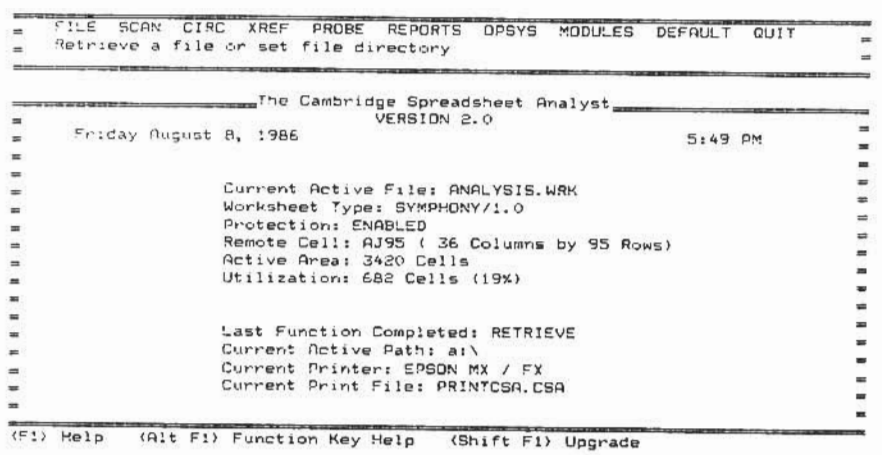
These problems have engendered a whole new breed of software designed to test and document the spreadsheet.

The newest and currently most popular package is the Cambridge Spreadsheet Analyst. Designed to audit spreadsheets created by Lotus's 123 and Symphony the Cambridge Spreadsheet Analyst will track down known errors, check for possible problems, probe into how the spreadsheet works, and document the spreadsheet. Surprisingly, the Cambridge Spreadsheet Analyst is quite easy to use despite the formidable task it undertakes.

The Cambridge does not require 123 or Symphony to be running in order to examine a worksheet. This is just as well since it needs nearly 200K of RAM to run. To start the Cambridge Spreadsheet Analyst from hard disk or floppy you just type CSAN at the prompt and hit return. Then insert the disk which contains the spreadsheet you wish to analyse.

The Analyst operates like both Lotus programs by duplicating most functions and cursor key commands and using horizontal menus at the top of the screen with a summary of each command as it is highlighted by the cursor. Lotus users will feel at home straight away. Files are retrieved just as in the application programs and the Cambridge will accept any version of 123 or Symphony files.

When the Cambridge Spreadsheet Analyst loads up a file it retains the files suffix such as .WRK or .WRI, and in an introductory table gives some very useful statistics such as the version of the Lotus application which created the spreadsheet, the remote cell (the furthest cell at the bottom right corner), the number of active



cells in the sheet and the number and percentage of cells actually utilised in the sheet.

Will not write

Before choosing one of the commands at the top of the screen, it is worth taking comfort in the thought that in spite of the power of this program to probe every cell location and notwithstanding its ability to go into a mode which emulates 123 or Symphony, the Cambridge Spreadsheet Analyst will not write to your data. Your worksheet will be preserved intact, warts and all, for you to amend only within the actual Lotus application at a time of your choosing.

The Analyst has six principal functions which are displayed on the initial screen in a horizontal row like a Lotus menu. These commands are SCAN, CIRC, XREF, PROBE, REPORTS and MODULES.

Unusual situations

SCAN would be the most used command and when invoked it searches cells and/or ranges for unusual situations which may indicate errors. The user simply selects SCAN, hits the Enter key and sits back for about a minute while the Cambridge does its work. A very large and complicated spreadsheet will take about two minutes. At the conclusion of SCAN a summary is presented in table form which has counted the number of occurrences of suspect locations such as formulas with questionable references to lables, to null cells or to cells outside the worksheet. Cells with ERR or NA are also counted as are overlapping ranges. Even apparently innocent constructions such as formulas with reversed ranges (which Lotus allows) are noted since they may indicate an unexpected distortion caused by a deleted range reference.

SCAN appears to cover the most likely and least expected errors by identifying suspect relations. To get more detail on the possibly offending areas the user simply highlights the category and hits the Return key. If there were five instances cited of, say, invalid formulas, then the detail screen which is split into two windows would show the cell references of the five formulas in the top window and in the bottom window would be the formula of whichever cell in the top window was highlighted by the cursor. So to see each formula you just move the cursor keys.

Sometimes just knowing that a cell has a fault is not enough. You might not recall what particular relevance that cell had to the sheet and don't want to wait until you next have Symphony or 123 up and running. No problem; just hit the F10 function key and you are put in sheet mode which is identical in appearance and navigating function to the original application which created the sheet. So you can flick from table to sheet with single key presses and while in sheet

```
                              SCAN SUMMARY

                                                              Page 1 of 2

 INSTANCES                          CONDITIONS
 ---------                          ----------
         0    FORMULAS WITH QUESTIONABLE REFERENCES TO LABELS
         0    FORMULAS WITH QUESTIONABLE REFERENCES TO STRING FORMULAS
         0    FORMULAS WITH QUESTIONABLE REFERENCES TO NUMBERS
         0    FORMULAS WITH QUESTIONABLE REFERENCES TO NUMERIC FORMULAS
         2    FORMULAS WITH QUESTIONABLE REFERENCES TO PROTECTED BLANK CELLS
        42    FORMULAS WITH QUESTIONABLE REFERENCES TO UNPROTECTED BLANK CELLS
         0    FORMULAS WITH QUESTIONABLE REFERENCES TO NULL CELLS IN WORKSHEET
         0    FORMULAS WITH QUESTIONABLE REFERENCES TO CELLS OUTSIDE WORKSHEET
         6    FORMULAS WITH REVERSED RANGES
         0    INVALID FORMULAS

(F1) Help   (Alt F1) Function Key Help   (Shift F1) Upgrade
```

```
                              SCAN SUMMARY

                                                              Page 2 of 2

 INSTANCES                          CONDITIONS
 ---------                          ----------
        15    ALL CELLS WITH A VALUE OF ERR
        15    SOURCES OF ERR
         0    ALL CELLS WITH A VALUE OF NA
         0    SOURCES OF NA
         0    PROTECTED NUMERIC CELLS NOT REFERENCED IN ANY FORMULA
         0    UNPROTECTED NUMERIC CELLS NOT REFERENCED IN ANY FORMULA
       180    PROTECTED BLANK CELLS NOT REFERENCED IN ANY FORMULA
       409    UNPROTECTED BLANK CELLS NOT REFERENCED IN ANY FORMULA
         1    UNPROTECTED FORMULAS IN A PROTECTED WORKSHEET

(F1) Help   (Alt F1) Function Key Help   (Shift F1) Upgrade
```

mode use all the Lotus movements such as Home, End, Page Up, Big Right and Left and so on.

You really need the Cambridge Spreadsheet Analyst manual only to introduce you to the program for the first time and to explain the relevance of some suspect conditions the program identifies. If you are familiar with the basic Lotus methods you will also know how to operate the Spreadsheet Analyst.

Other commands

The CIRC command locates circular cell references by isolating any group of formulas dependent on each other in an endless loop, while the XREF command allows the user to specify a cell, range or Lotus function and identify where it is used throughout the sheet. The PROBE command allows the user to explore the network of cells that affect a chosen formula and effectively work upriver to discover the source of an error.

The REPORTS feature gives the ability to customise reports based on the above functions and direct them to screen, disk or printer. If you choose to print every possible report make sure you have plenty of paper! One report includes the option of mapping the contents of every cell on the sheet with the further option of spacing the cells, so their pages can be pasted in case you want to wallpaper the office with your creations. Fortunately that option also includes provision not to print empty cells and even to print only portions of the sheet.

The MODULES option points to the future utility of the Cambridge Spreadsheet Analyst. The modules are specialised add-ons which can be purchased separately from the program and will allow for further developments and features. This keeps the Analyst open-ended like the Lotus products it checks. As Symphony users can avail themselves of auto-attaching such features as DOS, spelling checker, text outliner or terminal emulation link, so users of the Cambridge Spreadsheet Analyst will be able to attach a macro checker and other add-ons.

I have been acquainted with other spreadsheet checkers, but the Cambridge Spreadsheet Analyst is the easiest and yet most fully featured example I've had the pleasure of using. It will operate on any IBM compatible with 192K of RAM and a hard drive or two floppy drives. You don't run the Lotus program with the Cambridge even though it has a sheet mode which looks like the real thing. The program features on-line context related help through pushing the F1 key. It can be operated by someone without knowledge of the spreadsheet programs which created the sheet under analysis.

Who is the Cambridge Spreadsheet Analyst for? It's for anyone who wants the assurance that his or her decisions are based on sound worksheets which can easily be documented and audited on hard copy. It's for the user or inheritor of a sheet created by someone else to see in the shortest possible time how that sheet works internally. In short, it is for any situation where spreadsheets are taken seriously.

Documentation

All serious spreadsheet creators should document their work. This is a tedious and thankless task when done only with the Lotus program that created the sheet, but is an easy and even exciting job when done with the aid of the Cambridge Spreadsheet Analyst. There is also that comforting reassurance that every nook and cranny has been looked into.

What obvious faults does the Cambridge Analyst have? You could say it's almost too easy to use. I mean it might actually encourage people to check out all their spreadsheets and then go hunting round all their colleagues for more spreadsheets to analyse!

Seriously though, it would be nice to have a function key template as is provided with Symphony or 123, because the on-screen display of the function key commands requires an [Alt][F1] press – not the easiest thing to rememb er. You shouldn't need to have a manual close at hand just to remember the function key commands; everything else is so easy.

I really can't find any other faults with the program. It might be of interest to know that it won't read a password protected sheet until the password is input. Bad luck if you thought this might unlock that spreadsheet with the forgotten password, but no worries to everyone else who can rest assured that their passwords still protect their files.

The Cambridge Spreadsheet Analyst has a retail price of $395, making it more expensive than utility type programs such as Xtree or Sidekick, but still considerably cheaper than the application programs which create spreadsheets or databases. If used methodically it will soon pay for itself by insuring the integrity of your Lotus spreadsheets and it will also contribute to considerable peace of mind if you can put a value on that. The Analyst is so easy to use and reasonably priced considering its power and time-saving ability that you should seriously consider your motives for not purchasing it when you consider how much you spent for the Lotus program that you swear by (or at).

On 1 to 5 scale with 5 being the best, the Cambridge Spreadsheet Analyst would rate fives all the way for ease of learning, ease of use, speed and function. As for value for money, that's your judgment based on what you know best – your business. ☐

Software provided by PC Power
Dennis Lally is the Information Officer in the Information Centre of Mobil Oil new Zealand Ltd in Wellington.

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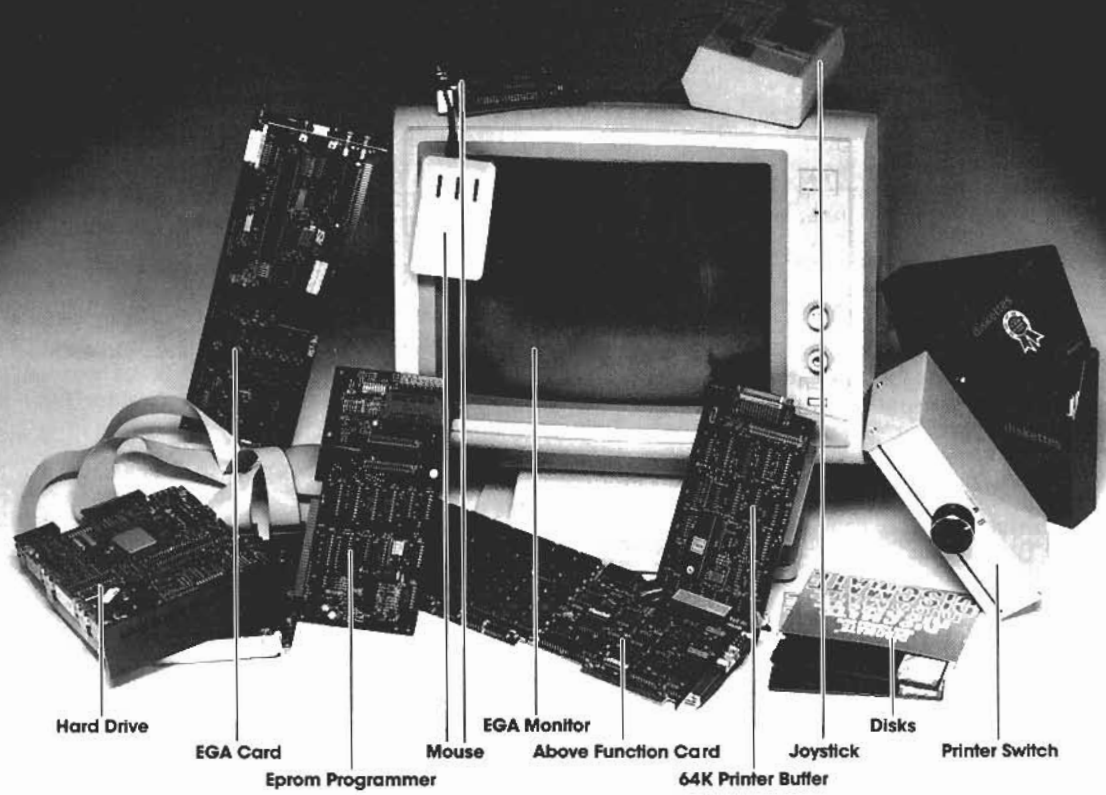

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Action 909

A real AT on your knee!

by Peter Taylor,
ANZIM APRINZ

I wondered just what sort of micro this Toshiba lap-top was when I was recently asked to look it over to provide a review and make comments as to the place of such machines today.

I was most agreeably surprised to find a really fine offering from Japan. Careful market surveys have brought together some very nice features which make the unit stand head and shoulders over others in this range. The usual fare of portables with floppy disks and LCD displays is now a thing of the past with this very neatly engineered arrangement. Here is literally a dream come true, with the capacity to achieve the necessary workload support for the serious user in the field.

This is real portability – taking with it all the advantages of the AT sized machines. I understand there is to be a 20 Mb hard disk version in time too.

The Toshiba T3100 came in the configuration of 640 Kb memory, 10 Mb hard disk, with three support manuals which included a very well-prepared MS-DOS operator's reference manual. Much of the material had been rewritten for this release. It all came in a quality hand or shoulder carry case with separate sections for the computer and ancillary gear.

At the centre of it all is the 80286 chip, providing all the power and speed needed to make programs perform as they should. It is a CMOS version of Intel's 16-bit 80286 (IAPX 286) and is the first example available of this lower powered chip, and the Toshiba's high performance is achieved through the use of this particular chip. Speed is software controlled and can be changed during program use, through the keyboard.

Another favourable feature of the micro, the keyboard has a great feel, unlike the several clicky counterparts. Because of size limitations it has been impossible to give the normal IBM layout, but the designing team has been able to produce a very pleasing result. The layout is easy to use, falls naturally to the fingering, and the extra controlling keys are not hard or awkward to locate, most falling naturally to the hand positions in use.

Although no numeric pad is provided, there is provision for a plug-on one as an optional extra if required. The cursor keys are in the bottom right corner, and pgup/pgdn/end and home keys in a vertical line at the right edge. Number and scroll/lock, together with prtsc and asterisk, are at the top right. The home keys are marked well.

Drives

The drives are married well into each side of the unit, the whole computer being the size of a small portable typewriter. But that is where the similarity stops! The 3.5 inch 10Mb hard disk runs very quietly inside the left side of the case. Automatically parking heads are a great feature and do mean that you are able to shut down quickly, as they park after five seconds of non-use. I found the setting up of files and directories straightfoward, and moving files around no problem.

The 360/720 Kb disk slot on the right side is easy to access, though slightly out of sight, and it worked well. Formatting disks was straightforward, although some of them had been used on very different machines previously. It too was near silent in operation, and I found the system allowed a diskcopy A: A: without trouble.

Speed is the word when programs are loaded and run, and whereas you may have had time to sit back and prepare for the task on other units, now you will be almost immediately into the job on hand. A number of colleagues who saw this machine in action where agreeably surprised with its turn of speed.

Across the centre of the machine, along the folding area, are a number of LED indicators providing status information on both drives, the number, capslock and scroll lock keys. They are neatly arranged and not intrusive on the line of sight. One shows the operating speed of the processor, red for slow, and green for fast.

On boot-up the T3100 is in fast speed, and simply using the ctrl/alt/pgdn while working allows the user to slow the processor down, handy in some software areas, particularly when one needs to follow what is going on. Ctrl/alt/pgup resumes high

speed mode again. Ctrl/alt/end will switch the video output to the RGB outlet and ctrl/alt/home brings it back to the display. An indicator marks which has been set.

Software

In testing the unit for this review, I was able to have on board three different wordprocessors, two database management programs, and various other aids including Norton, together with numerous files for actions.

Using the WP program was easy and it performed well. Multimat performed similarly, and then I used my normal WORD program where I was able to do all that I am used to doing, including using the two printers (daisy and dot-matrix) which just plugged into the ports on the rear of the case.

The unit tested had a very nice Menu program, ensuring a smooth entry to the action on turn-on. By throwing up the available programs in groups, and allowing selection through simple letter entry, it is possible to gain a quick startup routine for any micro. Exit to DOS is there too, for those wishing to come through things that way. My test unit helpfully had Sidekick on board. It was extremely quick and easy to use the directories and paths around the system. The system-required key allowed entry to configuring the screen when such special software was available to operate in that area.

I noted that in some recent testings run by others this micro features very well indeed. It has things together in the right places and with the LSI (large scale integration circuitry) is able to handle electrical paths most efficiently. Technically this provides real advantages in this field where large scale integration is allowing the shortening of the electrical paths and increasing operating speeds. In this machine all of the normal operating boards are on one under the keyboard. Yes, everything!

Other programs and tested included Open Access and Autocad. Several games packages including Decathalon and Jet worked very nicely too. The serial Mouse will work well, just plugged into the serial port and with the mouse support programs already on board.

Finish

This is a nicely presented unit and is well finished, the model tested being a dark grey colour. It is neat in shape, with the lid (and display) folding into the top front of the case and its central latch easily used when required. A separate unit carry handle fits into the bottom of the back and

(Continued on page 25)

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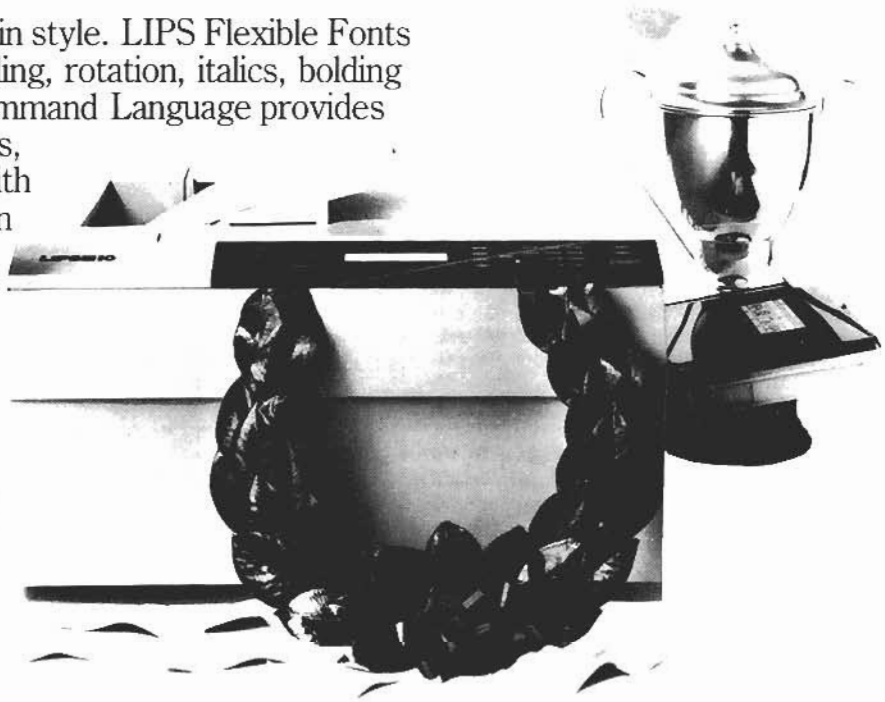

Fitted with both centronics and RS-232-C ports, the LIPS-10 Laser printer is compatible with the IBM-PC range, compatibles and most minicomputers. It emulates the Diablo 630 daisywheel and Epson FX-80 matrix so you won't have to modify your word processing or software.

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it sprints marathons!

covers the ports when folded away. When not in use this handle doubles as a rest and tips the computer forward giving a much nicer keyboard angle. Leads are then easily attached to the approprate ports along this back lower portion of the unit. A removable area allows entry of the 2 Mb working memory or modem boards which are available as extras.

As it is so small and light in weight, it is easy to handle in the office or at other sites. Managing it in and out of the holdall supplied is also easy. While doing this review I have taken it to a number of situations and found it most comfortable to handle and manage.

Being IBM compatible and loaded with your favourite software, this unit will prove to be a most useful and handy sized portable indeed. Being able to just shut down and pack it off with you so easily its best feature. Then with the terminal/modem card inserted and cabled appropriately, you are able to carry on some powerful computing, attached to your main system, through normal communications packages.

Display

One of the key features of the unit is the very clear display, a most significant part of the micro as the technology behind the screen allows its ease of use. Unfortunately, owing to the power requirements of this screen (and the hard disk) the unit is not provided with battery power. There is, I understand, a very neat small-sized mains power unit incorporated into the rear of this unit which deserves mention here.

Providing this clear display is a distinct advantage, and Toshiba engineers have certainly reached a very worthy result in this unit. Gas-plasma is a different type of display and I found it was not hard on my eyes as I had first thought it could be. I have observed the fuzz on some other gas-plasma displays but this one is beautifully clear and without any "bleed". I found no inconvenience at all, in all my use of it for hours on end.

The display moves through a wide range of angles and the letters are displayed n double pixels, making all characters very much more easily seen, in both day and night use. Reverse video is also available but the characters are not so easily visible in this mode.

Although the 640k appears to be maximum, there is a further 2Mb available on a special plug-in arrangement. This clearly should take the 3100 into the real computing range, as it would allow various types of virtual memory use to make the unit even more able to do those things needed today.

I understand the whole PCB takes up the area of less than one plug in an IBM card! It sits under the keyboard to allow the other units and boards to plug from it towards the rear of the unit.

Overall

This is a very nice machine indeed, and I'm sure it will find its way into many executive uses. For sheer convenience alone it will attract many who want to be able to have that capacity and power with them. Programs are easily available, and on-site convenience will score with it too. I'm sure many will appreciate the ease of handling this machine, with the market finding that these machines are now available, if the traffic into the Auckland agency is anything to go by! Recent testing and some program checks here show this unit to have a high level of compatibility with the IBM software.

The Toshiba lap-top range runs from the battery-powered T1100, with 256k memory, one 3.5-inch diskette drive, liquid crystal display, parallel and RGB port at $3500.00; through to the T3100 described in this review at $10,990.00. The T2100 intermediate model at $6,350.00 has 256k memory with two 3.5-inch diskette drives, high-resolution gas-plasma display, dual co-processor, serial port, parallel port, external video port, calendar clock, expansion slot, and 2.11, and 3.2 MS-DOS. A 384Kb memory add-on card is available.

The T3100 also has a RGB colour port and can be supplied with a 2Mb memory card. Further options include the 10-key external numeric keypad, a 5.25-inch external drive, a 1.2Mb external drive, and a 5-slot expansion chassis.

This Toshiba has to be the fastest and most powerful lap-top I have ever seen. It can be looked on as an excellent buy and will take its place in the executive case. Being so powerful it will not be long before there are some great offerings to go with it too. In the area of cost comparison the T3100 must rank far and away above many other offerings, particularly when attached to your system during the day and at home for those other tasks at night.

Try one soon!

(Review machine supplied by Southmark Computers Ltd, Auckland.)

SPECIFICATIONS		
Name	Toshiba T2100	Toshiba T3100
Manufacturer	Toshiba Corporation, Japan	
Processor	8086-2 (7.16/4.77 MHz)	80286 (8/4 MHz)
RAM	256 Kb exp to 640 Kb	640 Kb exp to 2.6 Mb
Disk	one or two 360/720 Kb internal floppy drives (all 3.5-inch)	one 360/720 Kb floppy one 10 Mb hard drive
Display	gas plasma, 640x400 pixels, 80x25 characters viewing area 192x144 mm	
Keyboard	81 keys, full travel	
Peripherals	External video ports (RGB and composite) Serial port Parallel/external 5-in. FDD port Calendar clock/system configuration memory	
	Expansion slot	Expansion slot RGB colour port
Options	384 Kb memory exp.card	2 Mb memory exp.card
	300/1200 baud internal modem card External 5.25-in. floppy disk drive I/O expansion card (internal)	
Power supply	115/230 v switchable	
Dimensions	311 x 80 x 360 mm (W x H x D)	
Weight	5.9 kg	6.8 kg
Price (NZ)	$6,350	$10,990

Icons on your Commodore 64

by Joe Colquitt

GEOS, Graphic Environment Operating System, is a package designed by Berkeley Softworks and promoted in association with Commodore to run on the Commodore 64, 128, or C64C. The set I received consisted of a GEOS Disk, Work Disk, and manual. Future sets will be part of the Disk Drive Package.

The entire program is icon-based, using pictures to represent procedures, as seen on the Macintosh, Amiga and Atari ST. Control is by joystick, and minimal typing is required by the user, which simplifies moving about the various modules. At first I though this would appeal more to the casual or inexperienced computer user, but after using GEOS for a while, I found it was nice not to have to search for keys, except during disk or file naming.

The initial GEOS screen (Desktop) is an icon menu on a note-pad, with a selection of pull-down menus across the top of the screen, and a printer and waste-basket in the lower right corner. The pages of the note-pad can be flipped over to reveal files on the disk. From this screen you can access files or modules, or make back-ups of the GEOS modules to create work disks. The main GEOS disk is used only for booting the system and creating work disks.

As the main GEOS disk has all the modules on it and is full, unwanted modules are scratched from the work disk by selecting their icons and putting them in the waste-basket, leaving room for user files. Separate work disks can be created for the two main utilities geoPaint and geoWrite, or an accessory such as Note-pad. Lesser modules include Calculator, Clock, Preference Manager, and Desk Top. All input/output is via 'disk Turbo', which claims – and appears – to speed data transfer around five times.

This is an excellent bit-map utility, allowing an entire 640 pixel wide by 800 pixel long document to be printed. Ten-inch printers will print only 480 pixels wide, so that must be borne in mind. I can't think of another utility that will print that wide. Other programs only print a 320x200 screen, and turn the picture around to fill the paper. The selection of printer drivers includes Commodore, Commodore compatible, Epson, C.Itoh and others detailed in the manual. I used the module on a C.Itoh 7500 (8510 option) and a Star NX10C with good results on both, but a very big disappointment to me was that I couldn't get a peep out of my Riteman C+. If anyone has managed it, I'd love to hear how. Believe me, I tried a lot of combinations.

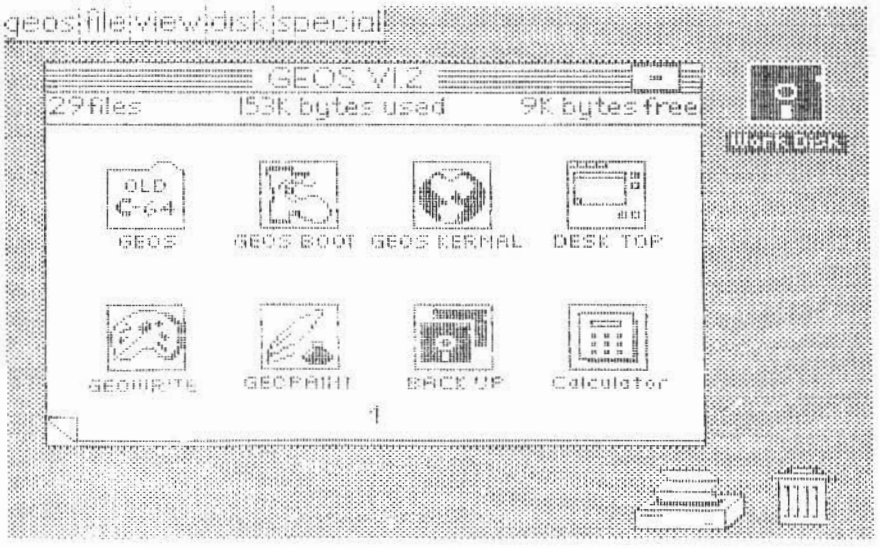
geoPaint is icon-driven, with a collection of sub-menus across the top of the screen, and has many outstanding features. It's high-res colour

bit-mapping, so what you see is what you print. The actual drawing area is a window that can be moved around over the entire picture, the position of the window being shown at the bottom of the screen. A 'preview' shows the entire page in miniature, which is handy when planning a layout.

Drawing tools are a pencil/eraser, a paintbrush with different tile patterns, an airbrush, magnified editing, several fonts/points of text, filled or open circles and boxes, lines, pattern fills, cut/paste/copy, measuring facilities, mirror, invert, clear, and undo. Text can be added from geoWrite, as can geoPaint pictures be used in geoWrite.

geoWrite

Like geoPaint, geoWrite is chockfull of options. The majority of the screen is the writing area, with pull-down menus and a ruler across the top of the page. Left/right scrolling is automatic when screen boundaries are crossed, the screen window viewing just over half of the document width. Margins are set by pulling the margin indicators along the ruler, and a similar procedure is used for setting up to eight tab stops. Page breaks are allowed.



There are six fonts in a variety of points and outlines, such as italic, bold, and open. Combinations can be used on the same page, which allows for a header or footer in large Dwinelle (ye olde English) and the text body in a small University typeface. I could find no mention of right-justification, but this should not present much of a problem as spacing can be edited. The full width of the document is 480 pixels. Although not a full-blown word-processor, geoWri-te is a versatile utility that can easily produce some fancy documents.

Accessories

GEOS has several other modules that can be used in conjunction with the main program. Alarm Clock is a settable clock that keeps time while you are using GEOS, and will sound

an alarm at a specified time if required. Calculator is a four-function calculator which, like other accessories, can be called at any time. Note-pad can store 127 250-character pages of notes, either as permanent files on disk or as temporary notes available in other modules.

Text Manager and Photo Manager are two similar modules. Text Manager stores snippets of text that can be compiled into a larger document, or pasted into geoPaint. Photo Manager is used in the same way with graphic images, and the two together are not unlike Newsroom.

Preference Manager is where you get to have your say in the GEOS operating system. It allows you to set the border, back/foreground, pointer shape, speed and acceleration, time and date. The changes can be saved to various work disks or left temporary, lost when the power is turned off.

QuantumLink is a wide-ranging modem utility on side two of GEOS. Unfortunately, all the references are to American services, and Commodore is seeking information on its use in this country.

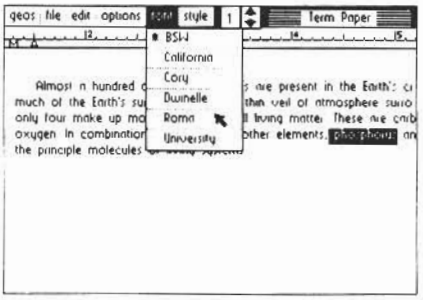
Although sizeable, the GEOS manual is not unmanageable, and is helpfully cross-referenced. Most of the time you would be using a GEOS module and need only refer to that part of the manual. It is necessary to read the first section in order to get an overview of GEOS as a whole, but geoPaint and geoWrite have their own screen menus, and only occasional reference for special operations is needed.

For and against

The manual is good, the modules are excellent, the accessories are a thoughtful bonus, the pointer is well controlled, and the icons/menus make life very easy. The screen layout is well presented, and the turbo disk feature keeps things running smoothly. It's also possible to make use of the GEOS speed to load and run your own BASIC programs; when finished, insert GEOS master disk, tap Restore, and watch GEOS reboot automatically.

Occasionally GEOS wouldn't boot first time (on several drives), but I think that's probably a side-effect of the disk's non-standard format, and is not a major worry.

The failure to drive the Riteman, however, is a serious drawback. I'm not saying that parochially, but because the Riteman is a popular printer. To be fair, the GEOS review copy is version 1.2, and I understand that future versions will fix the problem, but it still puzzles me that none of the Commodore, Epson or C. Itoh drivers works on it.

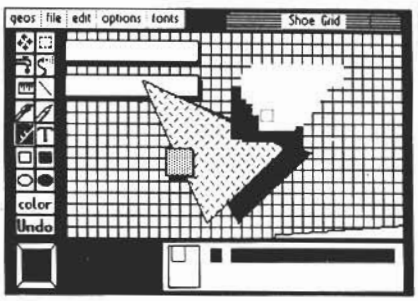


Changing Fonts

Overall, GEOS is a worthwhile acquisition. After my disillusionment with the printer, I would recomend an instore demonstration before buying. The ultimate output from GEOS is a printout, so it's in the user's best interest to do so.

On the way from Berkeley are mouse, trackball and drawing-pad input routines, as well as the other printer drivers, which in the USA are available free by modem over QuantumLink. Other major support modules are also planned on later versions. At the moment GEOS seems to retail for around $160, with prospects of being a bit cheaper later on, and Commodore will include GEOS with sales of disk drives in the future.

Review copy of GEOS supplied by Commodore Computer (NZ) Ltd.



Erasing

On micros and mainframes

By Paul Bieleski

I suppose that any of us old timers who have been in the computer game for a long time can be a bit of a bore going back to the old days of computing. However, we can see that the more things change the more things are the same.

The advent of the micro computer has meant a start from the beginning again in developing computer software. It was described as a great leap backwards. Many experienced people who have stayed with the mainframes look down their noses at the micro and dismiss them as toys. They have a lot to learn.

I have a note in a diary that I made a breakthrough on October 21, 1963. I coded and got running a program on the one day. This was an invoicing program for a large NZ company, to run on their new system, a 4k IBM 1440 system with one disk drive containing two million characters on a five kg disk pack. It had a cycle time that enabled it to process a character in about 12 microseconds.

Recently I had occasion to work for the same firm again. It now uses a large IBM mainframe with terminal links to branch offices and the development centre. The application being developed was a re-write of the current invoicing system and was using all the latest software, on-line systems, database systems, development aids and documentation systems.

The wheel had turned and I was back where I had been before – large systems I had left behind in 1977, and a client and application I had worked on in 1963. However, in the meantime I had got some experience with microcomputers and purchased one in 1981. I experienced some of the system development I had already had before and went through much familiar ground.

While the mainframes have developed enormous computing capacity and the software has developed, my impression remains that the development micros have made, especially in the area of software, means that the micro is a more productive area for getting things done.

In many respects micro hardware can stand comparison with the mainframers. On this job I went back to using IBM 3270 terminals. What monsters they are compared to current micro terminals! The 3270, while having a good quality screen display, is monstrously large and difficult to adjust to ergonomic positions. The keyboard is also heavy and awkward to position, and not as well laid out or having the good feel of a good micro keyboard.

My work involved the use of an editor called ROSCOE, part of a whole array of software components used by the teams of people working on the development. What a come-down this seemed.

My micro editor (Magic Wand) is a bit old but is better in every respect.

Instead of a reference card I had to use a reference booklet. There are a lot more commands and functions to grapple with because of the complexity of the mainframe environment, yet the commands in common use were not as easy to use. There was no tutorial such as is becoming familiar in the micro area. Roscoe is more tuned to work with single lines rather than the paragraph I had become used to. The window on to the data was only 18 lines instead of 23, and these were shortened by a sequence number that was of little use to me.

Low work speed

However, the most annoying defect compared with the micro was the speed with which one could work. Because of the design of the IBM 3270, whole screen frames were passed back and forward from the mainframe. The mainframe may be very much faster thana micro, but the result was slow, and what was worse, it was irregular. Very few responses were within the two-second limit for continuous work, and a high proportion were well over the 15-second maximum for avoiding memory lapse.

If this is the state of the art on mainframes, then they have a lot to learn from micros

When working on documentation the lack of word wrap meant much more work was required to input text. With my micro I can type flat out without the machine holding me up. I did not have to worry about carriage returns. I used them to mark the end of a paragraph. If I could type 40,000 characters without pause, my micro would keep up no matter how fast I typed, but not ROSCOE, Many times I was led by my thoughts and went over the short line ROSCOE allowed me, and the system effectively hung up. If this is the state of the art on mainframes, then they have a lot to learn from micro software.

To scroll over multiple pages, I am used to hitting the one key several times to get to the page I want as quickly as I like. With ROSCOE I needed multiple key actions for each page, and I had to wait the many seconds for a response back from the main frame before going on. If I repeated the key sequence too soon the system hung up.

One aspect of this mainframe environment that shocked me was the acceptance of text in capital letters. Large systems by their complexity require much more thorough and extensive documentation than a small system, and yet only capital letters were used. The use of capital letters is an obstacle to communication. People take longer to read capitals and misreading is more common. There are very sound reasons for children to start learning to read in solely lower case. Why is the mainframe area so backward in this aspect when they ought to be ahead of the "cheaper" micros?

The documentation formatting program did not have the capability of a micro word processing package such as Magic Wand or Wordstar, either.

The slow response of the main frame and the poor editing facilities made me wish I was working on a micro and relaying data to the mainframe as little as possible.

While not working in the database area, I was left with bad impressions there also. The operating system, the on-line system, and the database system seem to have been built up over time in layer after layer of software with the result that one requires an enormous investment in education and practice in a multitude of unlike systems. The work is highly partitioned with each area having its own special system to make it easy, and yet on the whole it seems so difficult and complex that it takes a lot of work to make a small change.

All these systems mean more people are required just for managing them. The development of integrated packages for micros seems to me to be ahead of the mainframe area, if what I saw was typical.

Desk-top tape drive provides link micro to mainframe

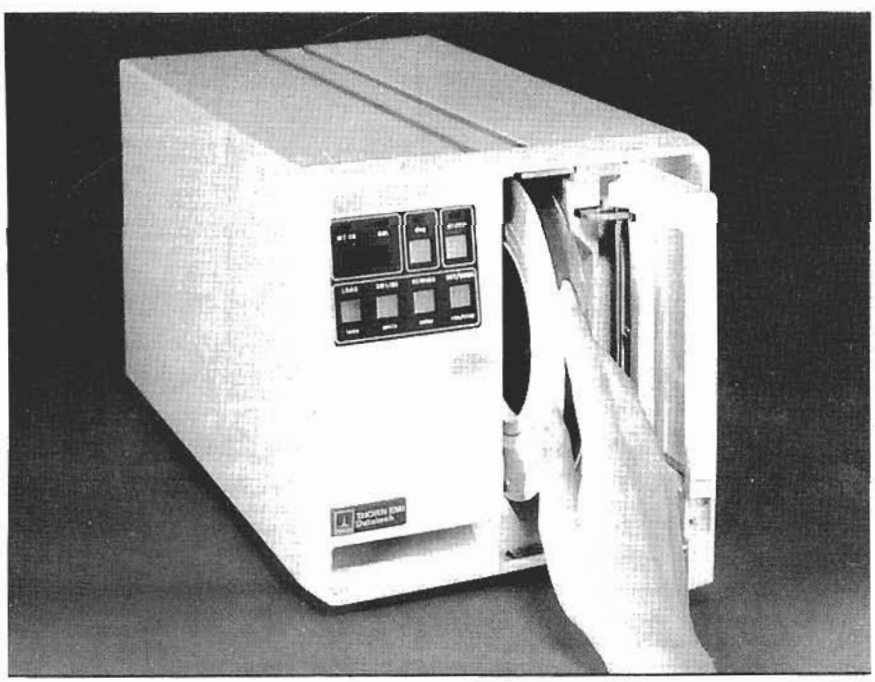
by Allan Manson

Microcomputer to Mainframe Links is a subject that is becoming increasingly important. More people are using PCs for their day-to-day business and are faced with the problems of transferring data between their PC and the company mainframe. The 9800 tape drive by Thorn EMI might just be the micro mainframe link you have been looking for.

Data transfer between PCs and mainframes has many advantages. You can use the mainframe to increase the power of your PC. For example you may want to enter figures generated by Lotus 123 into a company model resident on the mainframe. Or perhaps your PC printer is not up to printing enough copies of a very large report you have been working on, and it would be more convenient to print it on a laser printer connected to the company mainframe.

Connecting your PC to a mainframe is fraught with problems, not the least of which is the physical connection. If the mainframe uses synchronous communications you add the problem of incompatible protocols, and achieving a working solution usually requires the intervention of skilled people. At the mainframe site system programmers must configure access for your PC and communication engineers are needed to make the physical link work. Extra equipment such as protocol converters, synchronous cards and modems may also be required.

Speed is a factor if you are generating large files – to transfer a one megabyte file over a synchronous data link using 9600 bits per second and allowing for the overhead of a protocol would take about 15 minutes, assuming you had the link to yourself, and there were no communication errors! The same file on an async 1200 bit per second dial up modem would take over two and a half hours. With Lotus capable of addressing up to four megabytes, generating files of this size is not unrealistic.



The impact of your data on the mainframe communication should be calculated and taken into account for future expansion of the computing faculty. Properly managed, your mainframe link will allow a PC to access the mainframe interactively, transfer data files and remain flexible for your future needs.

Analysing your exact needs for a link, you may find that interactive communication is simply not necessary, as file transfer will achieve everything you require. Magnetic tape has many advantages and the ability to read and write half-inch magnetic tape may be the answer. Tape is the most common backup media used on large computers, it is reliable, and the technology is well proven and trusted. Transferring files to and from magnetic tape is very fast and fits easily in the normal day-to-day activities of computer operators. Communication specialists would not be needed.

I would see this drive and controller as a very useful addition to a PC LAN system. It could be used not only for file transfer, but also for its ability to backup a hard disk quickly, (in high density mode less than three minutes) as a bonus. The unit is too expensive to justify its use solely as a backup device.

Installing the 9800 system onto a PC or AT is very simple and can be undertaken by anyone familiar with IBM PCs, although I am sure Thorn EMI would be happy to provide any assistance if required. The controller card occupies one full-length slot in the PC and has a cable which connects to the tape drive. After installing the card, the user needs to transfer the files, from the floppy supplied

onto the hard disk of the PC.

Of the files, one is the operating program for the card, while the other is the main user program. No special procedures are needed for unpacking or installing the tape drive – just remove it from its container, check the mains connection and voltage, power it up and the diagnostics built into the drive will tell you if everything is OK!

Poeple familiar with tape drives on large computer systems will associate them with the problems of tricky threading procedures or with masses of vacuum and noisy air pumps. Not so with the 9800. Low pressure air is used for tape threading but the unit is not at all noisy. I found operating the tape unit as simple as a floppy disk drive.

To load the tape, the user takes the reel out of its case, makes sure the tape end is free, and places it in the vertical slot in the front of the unit. Close the drive door, press Load and the tape drive automatically threads and finds the start of tape marks. Press the Online button and the drive is ready for use. Operator controls provided on the drive are Load, Online, Rewind, Reset, High density and Diagnostics. A four-character alphanumeric display and four LEDs provide drive status information.

Thorn EMI manufactures and markets a range of magnetic tape drives from a rack mount 100 inch per second model down to the 9800 desk-top model, and also has controllers and serial buffer cards to match the drives. Most suitable for use with a PC is the desk-top 9800 tape streamer and a TC1500 tape controller, with its bundled software.

I expected a mainframe compatible tape drive to dwarf an IBM PC, but Thorn EMI claims its tape drive is the world's smallest standard half-inch drive, and it certainly is not at all obtrusive placed in the PC environment.

I would see this drive and controller as a very useful addition to a PC LAN system

In normal operation only Load and Online would be used, the drive then being under control of the host. Once the tape drive is on line, the Tape Manager software resident on the PC allows the operator to backup PC disks onto tape and restore them, save and restore selected files. Other very useful tape utilities are also provided to display the contents of a file and the structure of the tape. All functions of tape managers are accessed via an easy to use menu.

Most computer users possess little knowledge of the electronic and mechanical working of the machine they operate. It is not necessary to have such knowledge unless you intend to repair these devices yourself. However, access to good diagnostic programs and procedures is a must to locate exactly which unit is faulty in order to call the appropriate service engineers.

There appear to be no diagnostics for the controller card, but there is probably no need. The tape drive has 55 built-in diagnostic programs, useful not only to the service engineer but which also allow the user to validate the operation of the drive. Power-on diagnostics which include connector tests and memory tests also provide an indication as to the health of the drive. Maintenance of the drive unit would need to be car-

ried out by a trained engineer because of the tolerances and adjustment required. Service would involve module replacement so a failure would involve little down time.

A manual is supplied with both the tape drive and the controller card. The tape drive manual is of good quality, giving details of the operation and diagnostics available. There is also an important section on periodic cleaning and some good block diagrams of the unit.

The manual supplied with the controller is of much poorer quality and is aimed mainly at providing the user with information on the Tape Manager software. Its description of the various tape manager functions gives interesting general information as well as the necessary details. Installation of the controller card is included in this manual.

Applications for the tape drive are not limited to PCs. Supplied with an industry standard interface, Thorn EMI tape drives could be connected to many types of larger computer, as a cost-effective alternative to the original manufacturer's equipment. A spare PCB slot is provided inside the drive case to accommodate optional buffer cards, which allow theunit to be controlled via RS232 or current loop serial interfaces or bidirectional centronics or IEEE 488 parallel interfaces.

Thorn EMI's tape drives appear to be well designed and constructed. With their range of controllers, the drives will fit into many applications so there should be a good market for their product. ☐

Allan Manson is a product specialist with Datacom Equipment

SPECIFICATIONS

Thorn EMI 9800 Tape Streamer	
Reel diameter	178 mm
Tape width	12.7 mm (0.5 inch)
Tape format	1600 bpi PE IBM/ANSI/ECMA compatible 3200 bpi option
Rewind time	75 sec max (600 ft)
Unformatted capacity (900 ft tape)	
1600 bpi PE	17.25 Mb
3200 bpi	34.5 Mb
Weight	15 kg
Height	216 mm
Width	225 mm
Depth	390 mm
Price	$7690.00
TC1500 Tape Controller	
0.5 inch tape interface	industry standard (PERTEC)
Processor	Z80, 5 MHz
Data transfer mode	DMA, interrupt controlled
Data transfer rate	30 Kb/sec max
Height	106 mm
Depth	330 mm
Price	$3,355.00

THE FOURTH CHRISTCHURCH COMPUTER SHOW

One of the most popular seminars was given by Bob Radley (inset) on microcomputers and the share market.

Ashton-Tate stand.

The three levels of CBA software support and distributors are see in (from left) Kerry McFetridge, Businessworld Computers; Vicky McCullough, CBA; and Neil Currie, Mainland Data Processi

Microbee's stand attracted a wide range of customer interest.

Campbell Botting from the Whitcoulls stand across the aisle is shown how Autocad works by George Drayton.

Stands with chairs were appreciated by footsore viewers.

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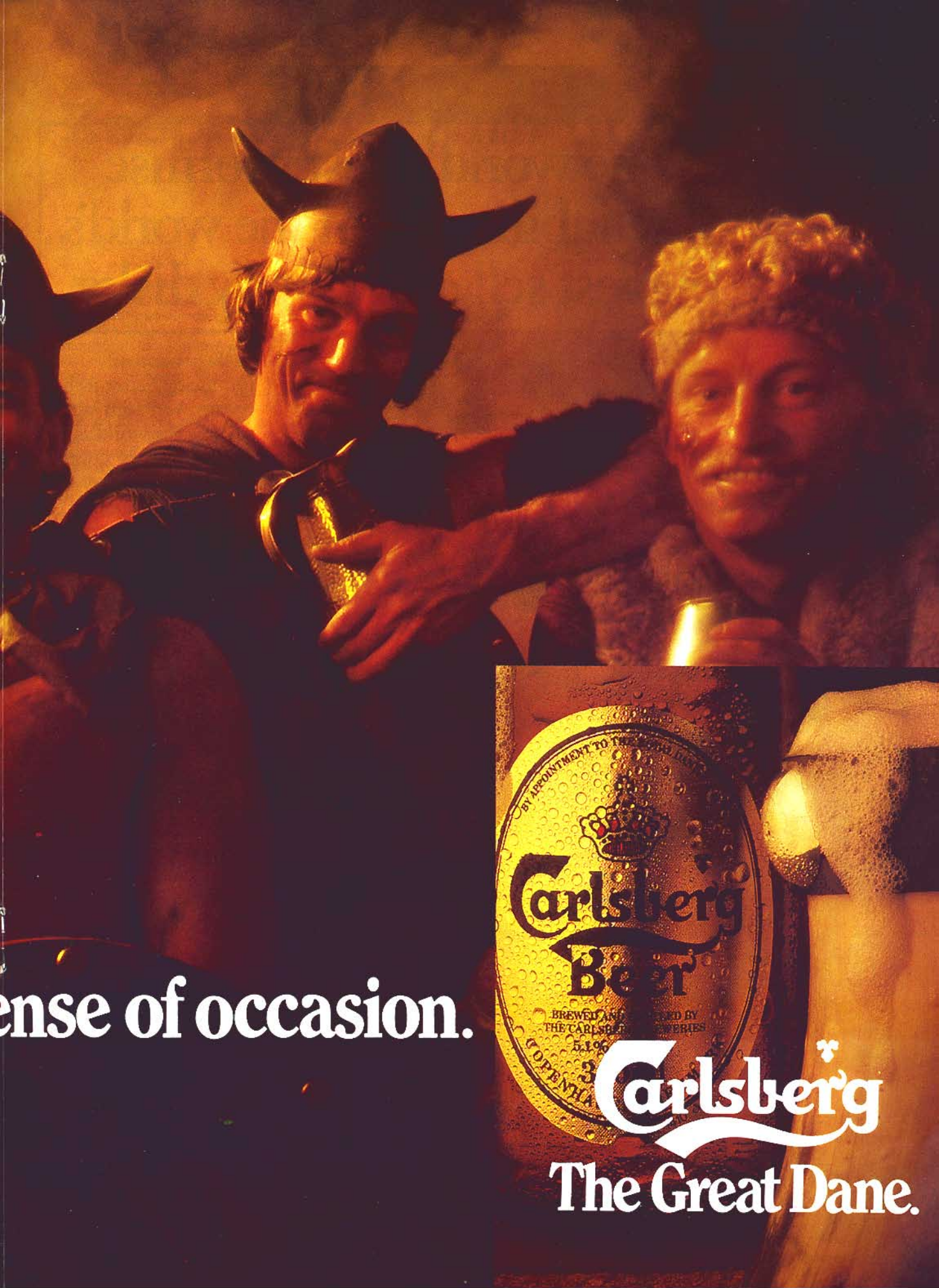
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Keeping up with the Joneses

by John King

After a slow start amid a multitude of predictions about its ultimate usefulness, computer-aided design (CAD) appears to have taken off, according to industry sources. One major reason is of course the availability of powerful CAD systems on PCs, the ever-lowering price of which has brought this new engineering tool within the reach of more than just the large manufacturing companies and government agencies.

At the same time, the mystique of CAD has perhaps led to an inflated expectation of its capabilities. "The only reason anyone is buying CAD is to keep up with the Joneses," says Cable-Price Engineering's Tim McMahon.

"A CAD system does not design anything, any more than a word processor can create writing. It is merely a tool. It will, however, make drawing and design more productive if it's implemented correctly."

He makes the distinction between systems run on micros, where CAD strictly means computer-aided draughting, and the proper computer-aided design able to be done on mainframes. Micros are limited at the moment, especially in their 3-D capabilities and truly integrated databases, but provide a good entry level with the prospect of future compatibility with mainframes.

"An army of industry tyre-kickers"

CAD systems are most often regarded as useful in the fields of engineering and architecture, doing away with the drudgery of repetitive drawing, especially where one small change to a detail can mean a complete redraughting. The ability to bring in a symbol from an attached library, or change the position of another detail, and then have CAD redraw the entire picture is very attractive to businesses with an eye on productivity.

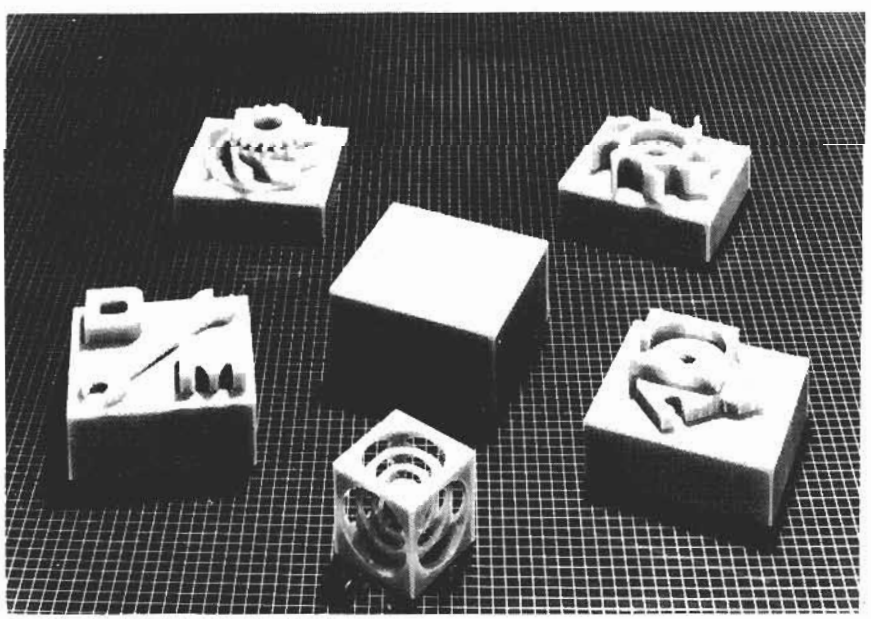
At the same time, CAD has to be approached cautiously. Architect Keith Leuschke, who could see some years ago that the movement was inevitable, bought the first Versacad system in Auckland, version 3.1, just a couple of months after its launch in the USA.

All drawing can be done with a mouse or joystick.

"It was a complete and utter mystery," he admits now. "There was nobody to talk to about it. I could see it was too early when I bought it, and on the first system I couldn't even produce a drawing, so it lay idle for some months."

While CAD might be thought to be ideal for the architect's needs, the computer has a basic incompatibility with his thought processes. An engineer might think about a project as a series of details, but an architect starts by thinking in generalisations, with a basic sketch of a building on a site plan. The computer wants to work the other way, starting with details which it can then join together with a high degree of accuracy.

"It's inherently inflexible," says Leuschke, "requiring specific and accurate information. I might want to move things a little bit, but the com-



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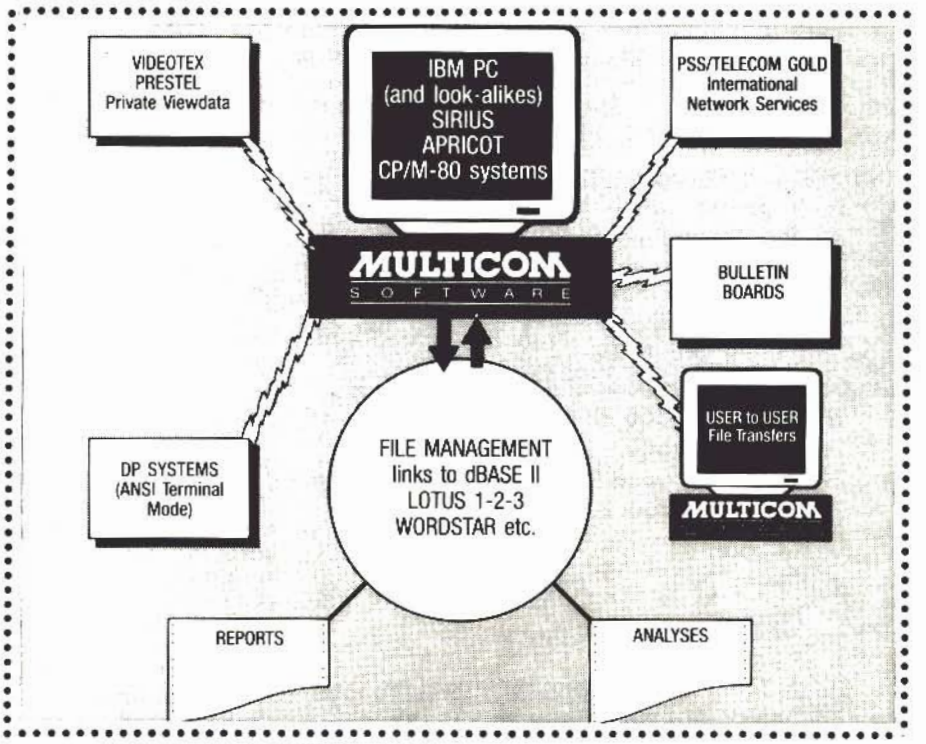

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puter wants to know exactly how much a little bit is. 'Nearly' or 'almost' is not a part of it."

JASMaD, the firm of architects and planners, has been using Autocad since September 1985, currently using two workstations to produce full working drawings, site and floor plans, but not perspectives. The CAD draughtsmen were taken on as new trainees and had learned the basics in a few days, but regard becoming skilled and fully productive as an ongoing process. Other draughtsmen will make the changeover to CAD as more workstations are added to its Autocad network, but there will always be a need for manual drawing, in JASMaD's opinion.

"Some will be faster, especially in the one-off situation," says CAD supervisor Mike Langridge. "But the more symmetrical and repetitive the drawing, the better suited it is to CAD. For changes, CAD is much faster, of course. We don't actually do much design on it – the architects do that on paper and hand it to the draughtsmen."

Each firm of architects uses a different CAD package. Keith Leuschke of Peddle Thorp & Aitken originally chose Versacad because of its original promise of backup and support, as well as the fact that it was a more simple system, easier to learn and use. Autocad is more easily adapted to the individual user's needs, with a large number of third parties writing specialised software, symbol libraries and other enhancements. "The whole idea of the symbol library is that you never draw anything twice," Mike Landridge points out.

Second industrial revolution

And where is CAD going from here? John Clancy, president of McDonnell Douglas Manufacturing and Engineering Systems, says that computer-aided design and manufacturing are tools that are being used to fashion a second industrial revolution. However, whereas CAD/CAM systems are still the exception in industry, he echoes another's opinion that "in five years' time there won't be a company worth its salt that doesn't have CAD".

Ironically, perhaps, in the light of CAD/CIM (computer-integrated manufacturing) being the direction of the future, the whole idea of computer-driven manufacture started with programmable machining tools. And a recent development in that field is the CAMM-3, a computer-aided modelling machine which can take a CAD-generated drawing on a PC system and make a 3-D model.

"Draughtsmen are adapting, and my prediction is that toolmakers will have to do the same," says Bennie Gunn of Concorde Communications. "CAD draughting is in only two dimensions, and the 3-D package for Autocad, for example, gives only an illusion, which is true enough on a screen."

The CAMM can take those ideas and transform them into an actual model. Any need for detail changes can easily be seen and making those changes is little more complicated than altering a CAD drawing. It has even been used to produce dies in tool steel for a fraction of the time and cost normally involved, to the extent that the cost of the equipment could be recovered by the end of the second job.

Yes, CAD/CAM is changing. The market has altered dramatically over the past couple of years ("There's been an army of industry tyre-kickers," according to one commentator), with real costs falling in line wit the increasing use of technology.

New Zealand is said to be among the top nations of the world in its reliance on computers, and while the CAD scene has been slow in comparison with its counterpart across the Tasman, there are signs that it will catch up. ▢

Amiga learns to draw

Reviewed by Colin Marshall

It is one thing having a computer that is state of the art and the rave of numerous reviews. It is another thing altogether obtaining software that actually does amazing things with the computer. To move out of the range of ordinary CAD (Computer Aided Design) and paint utilities one would expect Amiga software to be in a class of its own. Why? Simply that the Amiga began life on the designers' boards as a multitasking graphics machine that was to be not only fast but also able to make use of massive on-board RAM and fast-access hard disk systems.

These are some of the features that are exploited by Aegis Draw.

This is a CAD package for the Amiga, an advanced utility for creating accurate scaled drawings, flowcharts and diagrams. Companies in New Zealand are already buying Amigas simply to run this software.

Aegis Draw can be set up on a hard disk and can make use of as much memory as you give it to extend the number of drawings held in memory as opposed to being held on disk. The CAD package makes extensive use of fast memory to carry out a range of calculation and drawing tasks. The speed has to be seen to be believed.

The Amiga as supplied by Commodore NZ comes with 512K RAM as standard. This allows for two windows to be open at one time. Remember these are windows on a multitasking machine, which means that if you are having the computer print a large area, or amount of detail, you can switch to another window and work on something else at the same time. A nice touch.

The Amiga screen acts as a window to the drawing you are working on. Any feature on the drawing can be examined in infinite detail by zooming in on a specific point. In theory you could draw a picture of a city, zoom in on one building, then on one floor, one desk, to one letter, then on to a dot on an 'i'. We will stop there, as you've no doubt got the idea. A database is kept with detailed elements of the drawing.

Intelligent

Aegis Draw is an intelligent program. It knows what is on your drawing. It knows a circle has been drawn, recognises a square or any other essential shape. This is different from a paint program that only stores a record of the coloured pixels on a screen. Aegis Draw stores records of images, which means that if, at a later date, you want to return to the details of a given plan and modify some detail or zoom in on a feature, the shape you originally used is there for you to work with.

Using the program is easier than I would have thought imaginable for a CAD package with so many features. Firstly Aegis Draw can be loaded from the Workbench (Amiga's icon driver). The program can be driven using the drop-down menus, so much in fashion at the moment, and a mouse. All drawing can be done with a mouse or joystick, and Aegis Draw also supports a large range of digitising tablets, genlock (for connecting into a video recorder) and plotters (even multipen plotters!).

It knows a circle has been drawn, recognises a square or any other essential shape.

The documentation with the package is a well-presented book written by someone who can write, a dramatic improvement on most packages. The Aegis Draw book takes the most illiterate computer user through the stages of using the program – even to using the most advanced features.

It is impossible to comment on all the features of this CAD package so I will just remark on some of the main points under the Menu headings that are used in the program. The list here is by no means the complete list.

The Project menu allows the user to save and delete drawings.

The Edit menu has many features. All the old standards are there – cut and paste, copy and the like. The modify option allows the user to colour, rotate, distort and pattern objects as well as weighting lines. The group function places groups of selected items together as a part. For example, plumbing, electrical and floorplan details could go together as a part called 'Room'.

The Tools menu features some fascinating options that I can only list – line, rectangle, polygon, freehand, arc, circle, text, dimension, part, drag it, rotater, clone, eraser, explode, sizer, back and so on. These are all drawing tools which can be used to create and modify your work.

The Display mode allows the user to modify the screen display to suit the detail and design techniques he or she is familiar with. The display options include full display, zoom (in and out), grid, rulers, crosshairs, colour, and layers (up to 250 per drawing).

The Options window allows the setting of line weightings, fill patterns, grid sizing, scaling and rounding (rounds off those tradition jagged computer edges).

The Preferences menu is worth a slightly closer look. This includes features that one would only expect on a horrendously expensive system.

Layers – each drawing can have up to two hundred and fifty layers. These are not the parts but actual layers that can be overlaid on each other or taken individually. Instead of creating a room as a part as we did above, a house could be made up of layers – structural, electrical, plumbing etc. Each layer could be modified, examined, and printed individually or in conjunction with any number of the other layers.

Filled – turns on the automatic filling routine.

Numeric Display – cursor coordinates, which are really helpful when you have zoomed right in on a large drawing.

Grid Snap – this I found a great help in increasing productivity speed. When this option is turned on, a line that you have drawn is automatically taken to the closest grid coordinate (within a distance range that you specify). This saves having to peer at the screen to make sure pixels join correctly.

Data Snap – as for Grid Snap except that it attaches to the closest object you have drawn.

Rounding and Smoothing – two options that will both round off objects and smooth those traditional computer graphics.

In conclusion then, Aegis Draw is a CAD package that one would expect to find on a much, much more expensive system. This is one package that would make the Amiga a dedicated unit for many companies, architects and professional people. The range of features is extensive, comprehensive and at the current price of NZ $300-$400 is cheap. The graphics capabilities of the Amiga in conjunction with the Aegis Draw puts to shame the CAD packages offered on most other computers. This comes highly recommended.

PRINTERS by Tony Butler
IN NEW ZEALAND – 1986

During the late 1970s and early 1980s when the expression "Paperless Office" became a buzzword for the office computer industry, paper manufacturers worldwide started to tremble. Both in New Zealand and internationally, a number of paper manufacturers comissioned studies into the impact of computers on paper usage. The answers they got now seem obvious. The advent of the personal computer and the "screen on every desk" multiuser computer would cause a massive expansion in paper usage.

Printed material is the most common output of computer processing, so the choice of printer is important.

Computer users have become very used to (some would say spoiled by) the reliability of solid state electronics. They forget that a printer is a mechanical animal and is subject to wear in the same way as an ordinary motor car. The reputation of the manufacturer, and the service and spare parts support of the local agent, must be considered before a selection is made. We suggest you use this survey to come up with a short list of printers in your price/performance range, and then check on service and support before making your final decision.

This survey does not represent every printer sold in New Zealand, but covers those importers who replied to our questionnaire within the requested publication time frame.

Our classification of printers into four differnet groups is necessarily arbitrary. Over the last year the quality of print available from some dot matrix printes has improved immensely and the speed of fully-formed character printers has increased. The automatic rules of dot matrix for data processing and daisywheel for wordprocessing no longer apply. Similawrly the popularity of networked PCs and multiuser super micros has increased the sales of high speed page (laser) printers and line (band) printers, which may be used by many people in the same office or school.

The specifications given for each printer require clarification:

PRINT SPEED

The print speed given is the fastest that the printer is capable of. Where we have been supplied with the information we give three figures, characters per second (cps), lines per minute (1pm) and pages per minute (ppm). Based on an 80-column, 60-line A4 page and assuming the printer can move onto a new line instantaneously, conversions between these figures are possible. To go from 1pm to cps multiply by 1.333, or to go from ppm to cps multiply by 80. Unfortunately printers do not go from one line to the next instantaneously. As Basil Orr, C.Itoh distributor, says, "a Corvette and a Ferrari may go down the straight at the same speed, but watch the Ferrari go ahead on the turns."

PAPER WIDTH

The two common paper widths are 25cm (10 inch) and 38cm (15 inch). These two sizes correspond approximately to A4 and 'normal' computer line flow paper respectively.

FONT SIZES

Many printers have user selectable font (print) sizes. WE have specified

these sizes by characters per inch (cpi). On a typical 25cm (10 inch) printer 10cpi gives 80 characters per line (cpi), 15cpi gives 120 cpl, and 17 cpi gives 136 cpl. On a typical 38cm (15 inch) printer 10 cpi gives 132 cpl, 15cpi gives 200 cpl, and 17 cpi gives 225 cpl.

With the advent of desk-top publishing a number of printer suppliers are quoting printers point size rather than cpi. An exact conversion between point and cpi is not possible because point size relates to the size of the characters and not necessarily the gap between them. A simple and very approximate rule is to divide the cpi into 130 to give the point size.

PAPER FEED

These specifications are self explanatory, but if wordprocessing is a priority look for multiple bin paper handling under 'Options'. It is very useful to be able to select letterhead or follow-on paper or envelopes without having to reload the printer.

BUFFER SIZE

A buffer is a short term, first in first out memory store in the printer. This is necessary because your computer may send information to the printer faster than the printer can print. Without a buffer the printer would either crash or lose characters. Of course if the computer was set to a very slow speed a buffer may not be required but this means the computer cannot be used while printing is taking place. The exception to this occurs when your computer has a printer buffer (or spooler) built into it. It is then not always necessary to have a buffer in the printer as well. Ask your dealer about this one. A 2K buffer holds approximately one A4 page. The computer can therefore get up to one page ahead of the printer.

NEAR LETTER QUALITY (NLQ)

This is a very personal subject that we apologise for in advance, however we believe some attempt must be made to grade the printers. Near Letter Quality (NLQ) means exactly what it says: you can see the dots but only just. Letter Quality means that to the untrained naked eye the printing could have come from a typewriter.

NUMBER OF PINS IN PRINT HEAD

The print head of a dot-matrix printer is made up of a number of small pins that each prints a dot on the paper. The dots are used to form the characters that may be printed. The more dots that are printed to form one character, the higher the quality of print. The situation is confused, however, by double-pass printers that move the paper by a fraction of a millimetre and then reprint over the same line. In this way a 9-pin printer can produce 18 dot characters, but at a much slower speeid. When buying a printer check that all the software in your computer can run the number of pins in the printer.

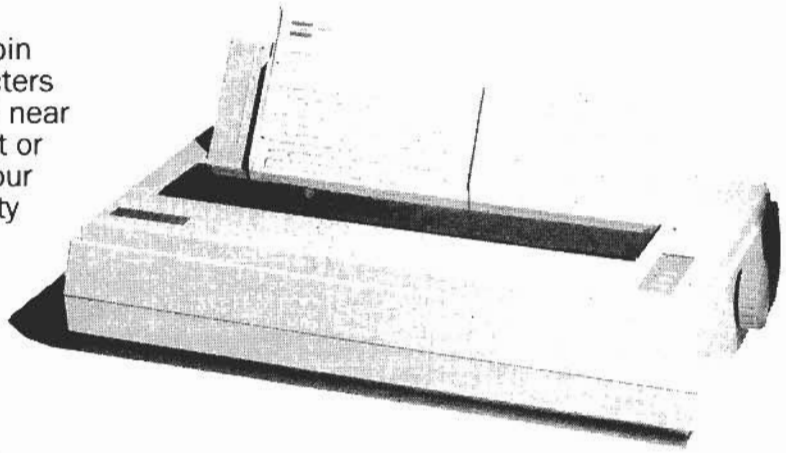
RIBBON TYPE/LIFE

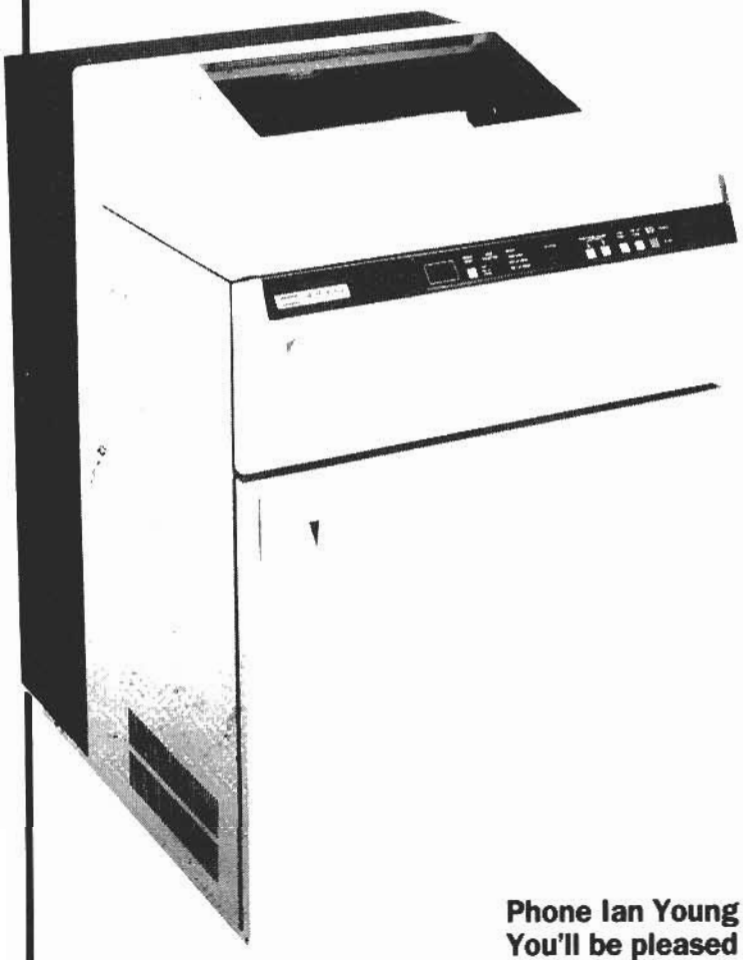
In general a carbon ribbon will give a higher quality print thana fabric ribbon, but the life of a carbon ribbon may be less than 10% of the life of a fabric ribbon. Very few dot-matrix printers have the option of using a carbon ribbon. Most dot-matrix printers rely on the ink fabric ribbon to lubricate the printing pins; the dry carbon ribbons are unable to do this.

GRAPHIC MODES

A printer is said to be operating in graphic mode when each pin is being individually controlled by the computer. This means that the print graphs, pictures and other non-standard characters. The software to achieve this varies for different computers and printers. Check with your dealer if this is important to your use of the printer.

This is the Fujitsu DX 2100 9 pin printer which runs at 44 characters per second, produces draft and near letter quality print, can be sheet or continuous fed, will print in colour and is renowned for its reliability and quiet operation.





This is the Fujitsu M3043 band printer which runs at 1200 lines per minute and produces the best quality print (even through 6 part forms). The M3043 provides the speed and unattended reliability to produce large quantities of printed material economically.

The **M3043** is the biggest printer in the Fujitsu range — the **DX2100** the smallest. Between the two are a whole stable of printers to match your requirements. Dot matrix 9 and 24 pin, Daisywheel, band printers, sheet fed, continuous fed, colour options. Fujitsu can provide them all.

Phone Ian Young of Thorn EMI and talk Fujitsu printers. You'll be pleased with the choice, the reliability and the service.

FUJITSU

THORN EMI

THORN EMI TECHNOLOGY N.Z. LTD

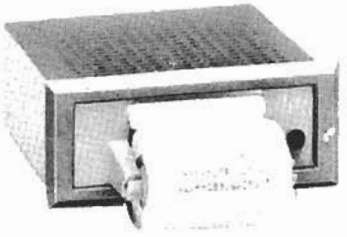
190 Great South Road, Remuera.
P.O. Box 74-018, Market Road, Auckland.
Telephone (09) 545-144

TCC 13012

PRINTERS

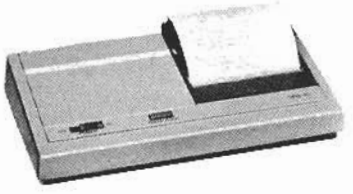
$2000 and under

SEIKO I & E DPU-10/13/16/20



Dot matrix thermal
Pins in print head: 7
NLQ feature: No
Print speed: 20 cps
Max chars/line: 13 chr/16char/20 char models
Paper width: 38mm
Paper feed: friction only
Buffer size: 1 line
Ribbon type: no ribbon uses thermal paper
Interface: Centronics parallel
Features: 4-6 vdc operating voltage, standby current 10ma. Panel mounting compact design 86x37x109.2 mm. Quiet reliable thermal printing mechanism.
Retail price: $290 plus GST
Agents: VSI Electronics (NZ) Ltd

SEIKO I & E DPU-40

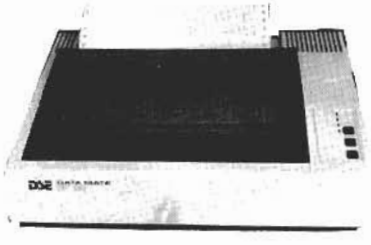


Dot matrix thermal
Pins in print head: 7
NLQ feature: No
Print speed: 24 cps
Max chars/line: 40
Paper width: 80mm
Paper feed: friction only
Buffer size: 1 line
Ribbon type: no ribbon uses thermal paper
Graphics modes: No graphics mode
Interface: parallel Centronics type connector
Features: with A/C adaptor 230 vac-9vdc quiet thermal printing process.
Retail price: $341 plus GST
Agents: VSI Electronics (NZ) Ltd

SEIKO I & E DPU-20/20/24

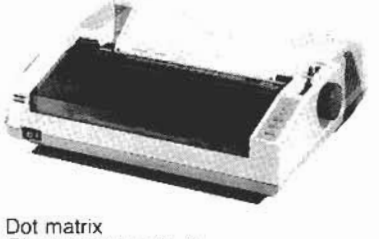
Dot matrix thermal
Pins in print head: 7
NLQ feature: No
Print speed: 16-19 cps
Max chars/line: 20 char and 24 char models
Paper width: 58mm
Paper feed: friction only
Buffer size: 1 line
Ribbon type: no ribbon, uses thermal paper
Interface: Centronics compatible parallel interface
Features: operates from 5vdc. Panel mounting 110x120.5x68.2mm. Upright and upside down printing options
Retail price: $400 plus GST
Agent: VSI Electronics (NZ) Ltd

DSE 130



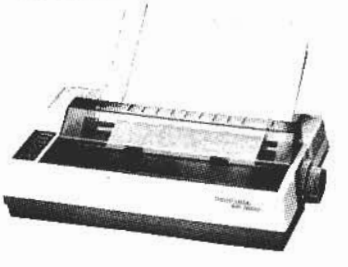
Dot matrix impact
Pins in print head: 9
NLQ feature: yes
Print speed in NLQ mode: 30CPS
Print speed: 130 cps
Max chars/line: 132 columns/line
Paper width: 4-10inch
Paper feed: friction & tractor feed
Buffer size: 2 K
Ribbon type: Multistrike
Graphics modes: Vertical 8 bits, horizontal 480,960,1920 dots/line
Interface: Centronics parallel 8 bits
Features: Normal, compressed, emphasised, double strike, IBM compatible
Retail price: $595
Agent: Dick Smith Electronics – all stores and mail order

FUJITSU DPMG9



Dot matrix
Pins in print head: 9
NLQ feature: Yes
Print speed in NLQ mode: 25 (10 cpi)
Print speed: 180 (10 cpi)
Max chars/line: 80 (10 cpi) 137 (17 cpi)
Paper width: 3.5"-10.5"
Paper feed: friction and tractor
Buffer size: 2K
Ribbon type: carbon, multistrike
Graphics modes: bit image graphics
Interface: Centronics
Features: compact reliable; versatile forms handling for flexible printing; IBM graphics printer compatible
Options: serial interface, one year warranty
Retail price: $NZ 700 Price does not include tax
Agent: Thorn EMI Technology N.Z. Ltd

SEIKOSHA SP1000

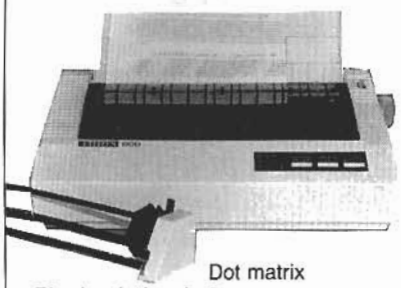


Dot matrix
Pins in print head: 9
NLQ feature: yes
Print speed in NLQ mode: 20-25 cps
Print speed: 100 cps
Max chars/line: 170
Paper width: 11 inch
Paper feed: rear
Buffer size: 2k
Ribbon type: Nylon multistrike
Graphics modes: Commodore IBM Epson Apple
Interface: serial & parallel
Features: variety of print characters set; automatic single sheet input
Options: bin feeder
Retail price: $780.00
Agent: Mitsui Computer Systems PO Box 9447 Wn

PRINTERS

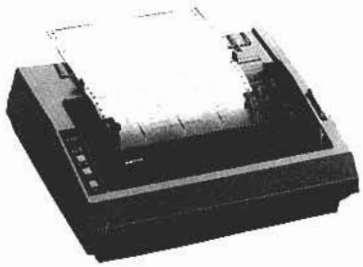
$2000 and under

Citizen 120-D



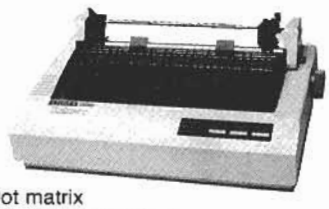
Dot matrix
Pins in print head: 9
NLQ feature: yes
Print speed in NLQ mode: 24 cps
Print speed: 120 cps
Max chars/line: 160
Paper width: 3-10 inch
Paper feed: Single sheets & fan-fold (friction, tractor feed)
Ribbon type: Multistrike
Graphics modes: Bit image 60,72,80, 90,120,144 & 240 dots per inch
Interface: Centronics 8 bit
Features: Dual configurations; Epson-FX and IBM graphics printer.
Options: Includes single sheet Feeder and tractor feed mechanism
Retail price: $795.00
Agent: Dick Smith Electronics - All stores and mail order

FACIT 4509



Dot matrix
Pins in print head: 9
NLQ feature: optional
Print speed: 120 cps at 10 cpi/ 60 lpm
Max chars/line: 132 at 17 cpi
Paper width: 4-10inch
Paper feed: tractor
Buffer size: 248 byte (2K opt)
Ribbon type: Cloth cassette
Graphics modes: Pin graphics
Interface: Centronics parallel
Features: IBM/Epson compatible. Epson RX80 character set.
Options: NLQ kit, friction kit, 2k buffer
Retail price: $861 plus GST
Agent: Northrop Instruments & Systems Ltd

CITIZEN 120D



Dot matrix
Pins in print head: 9
NLQ feature: yes
Print speed in NLQ mode: 25 cps
Print speed: 120 cps
Max chars/line: 136 in compressed mode
Paper width: 3.5-10 inch
Paper feed: push feed tractor, revolving platen
Buffer size: 4K
Ribbon type: multistrike
Grahics modes: Multiple graphics resolution, IBM or Epson compatible. Switch selectable.
Interface: Centronics – style 8 – bit parallel
Features: B/W reverse image print; paper out sensor. Bidirectional in text mode; hexadecimal byte format in text printing
Options: RS232C serial interface
Retail price: $890

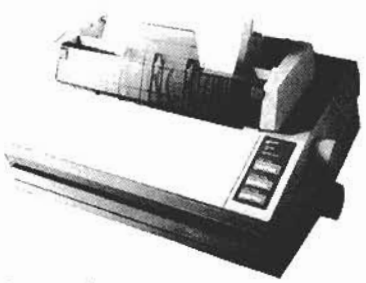
OKI MICROLINE ML182

Dot matrix
Pins in print head: 9
NLQ feature: 9 x 9 dual pass
Print speed in NLQ mode: 30 cps
Print speed: 120 cps
Max chars/line: 137
Point sizes: 5,6,8.5,10,12,17.1
Paper width: 10 inch
Paper feed: rear or bottom
Buffer size: 2K standard
Ribbon type: fabric – cartridge
Graphics modes: either block or APA graphics in single, double or quad density.
Interface: Serial RS232 or RS422 with a Current loop option.
Options: Serial RS232 or RS422 & C/L.
Retail price: $899
Agents: AWA (NZ) Ltd

OKI MICROLINE ML192

Dot matrix
Pins in print head: 9
NLQ feature: 17 x 17 Dual Pass
Print speed in NLQ mode: 33 cps
Print speed: 100 cps
Max chars/line: 137
Point sizes: 5,6,8.5,10,12,17.2
Paper width: 10 inch
Paper feed: bottom or rear
Buffer size: 8K standard 16K optional
Ribbon type: fabric cartridge
Graphics modes: either block or APA single, double or quad density graphics
Interface: standard as PARALLEL
Features: 10 inch pin feed on platen for max 1 Inch tear off (invoicing etc). On-line Menu Select mode allows command control from front panel.
Options: Serial RS232 and RS 422 interfaces along with current loop options.
Retail price: $999
Agent: AWA (NZ) Ltd

EPSON LX86

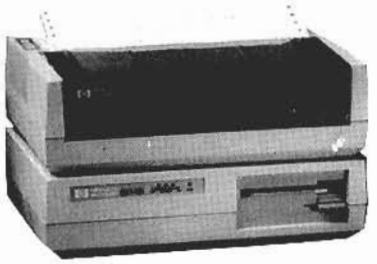


Dot matrix
Pins in print head: 9
NLQ feature: Roman
Print speed in NLQ mode: 25 cps
Print speed: 120 cps
Max chars/line: 80
Paper width: 10 inches
Paper feed: friction/tractor
Buffer size: 1K
Ribbon type: carbon
Grahics modes: Epson and IBM graphics
Interface: standard centronics
Features: front panel font selection IBM compatible
Options: cut sheet feeder
Retail price: $1052 (pre-GST)
Agents: Microprocessor Developments Ltd

PRINTERS

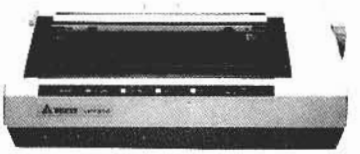
$2000 and under

HEWLETT PACKARD 2225A B C D



Dot matrix
Pins in print head: 11
NLQ feature: Yes
Print speed in
NLQ mode: 75 cps
Print speed: 150 cps
Max chars/line: 142
Point sizes: 10, 12, 16
Paper width: 8.5 inch
Paper feed: sprocket & grit wheel
Buffer size: 1K
Ribbon type: ink
Graphics modes: IBM graphics, HP graphics
Interface: RS232 serial, HPIB, HPIL, Centronics
Features: 50dB quiet compact print head replaced when cartridge replaced
Retail price: $1109
Agent: Hewlett Packard (NZ) Ltd

TECO VP1814

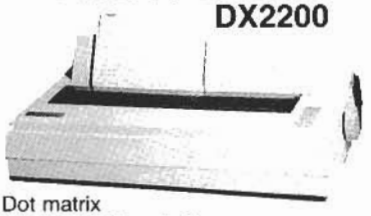


Dot matrix
Pins in print head: 9
NLQ feature: Yes
Print speed in
NLQ mode: 36 cps
Print speed: 180 cps
Max chars/line: 136
Point sizes: pica: elite: condensed: double width pica: dble width condensed
Paper width: 10"
Paper feed: friction & tractor
Buffer size: 7 Kb
Ribbon type: multistrike
Graphics modes: IBM & Epson control codes
Interface: parallel optional serial
Options: Serial interface
Retail price: $1195
Agent: Orchid Trading

OKI MICROLINE ML183

Dot matrix
Pins in print head: 9
NLQ feature: 9 x 9 two pass
Print speed in
NLQ mode: 30 cps
Print speed: 120 cps
Max chars/line: 233
Point sizes: 5,6,8.5,10,12,17.1
Paper width: 15 inch
Paper feed: bottom or rear
Buffer size: 2K standard
Ribbon type: fabric cartridge type
Graphics modes: block or APA graphics in single, double or quad density.
Interface: standard as parallel
Features: tractor feed included; OKI Version emulates ML83A; IBM Version (Epson) emulates IBM Graphics printers;
Options: Serial RS232 or RS 422 and Current loop option
Retail price: $1275
Agent: AWA (NZ) Ltd

FUJITSU DX21000 DX2200



Dot matrix
Pins in print head: 9
NLQ feature: Yes
Print speed in
NLQ mode: 44 cps
Print speed: 220 cps
Max chars/line: DX2100=80 (10 cpi) DX2200=136 (10cpi)
Paper width: DX2100=4" to 10.5" DX2200=4" to 16.5"
Paper feed: friction or tractor
Buffer size: 2K
Ribbon type: carbon, multistrike, colour
Graphics modes: Variable density. Bit image graphics
Interface: Centronics or RS232
Features: increased operation modes selectable from operator panel;
Options: field upgradable colour option, Automatic cut sheet feeder
Retail price: DX2100=$NZ1300 DX2200=$NZ1525. Prices do not include tax
Agents: Thorn EMI technology N.Z. Ltd

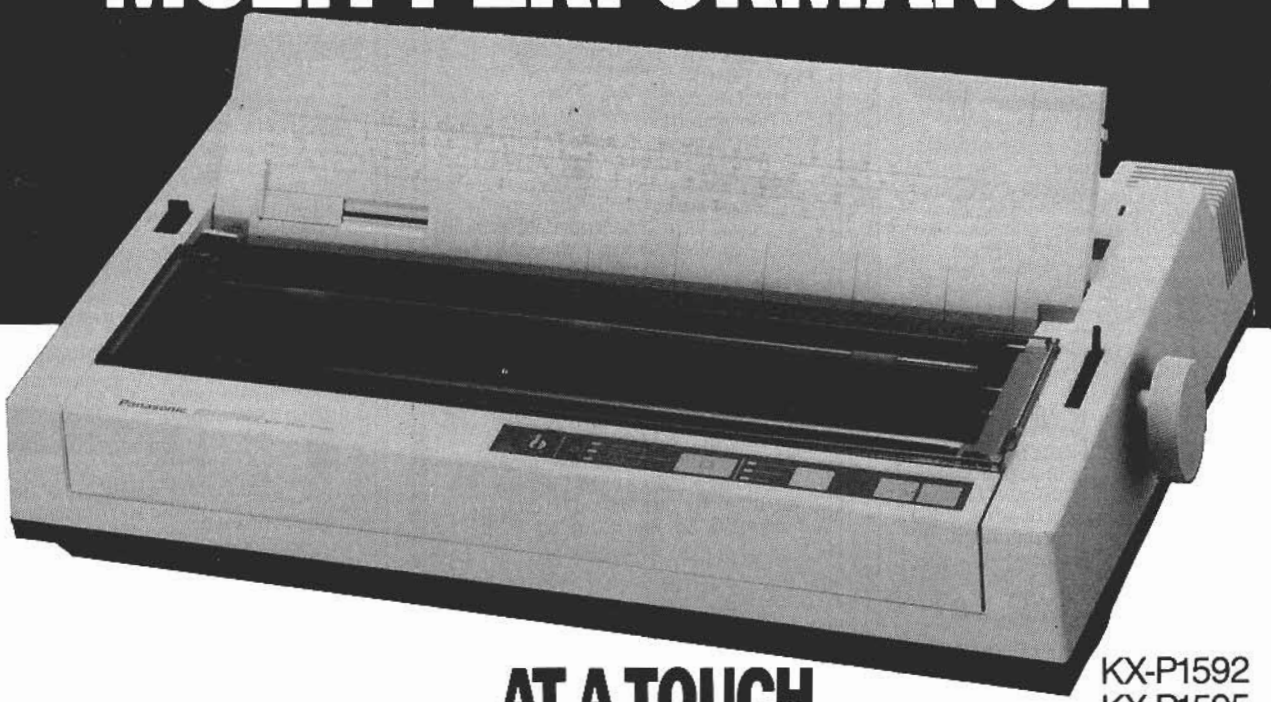
CANON PW1080A

Dot matrix
Pins in print head: 9 wires vertically
NLQ feature: yes
Print speed in
NLQ mode: 30 cps
Print speed: 160 cps
Max chars/line: 136
Paper width: 254mm (10 inch)
Paper feed: built in tractor feed, roll holder or cut sheet
Buffer size: 3K input buffer (selectable) 2K byte print buffer
Ribbon type: multistrike
Graphics modes: from 60 dots/inch to 240 dots/inch
Interface: parallel (serial optional)
Options: additional NLQ font rams available
Retail price: $1313 plus GST
Agent: Canon Data Products

CITIZEN MSP-10

Dot matrix
Pins in print head: 9
NLQ feature: yes
Print speed in
NLQ mode: 32 cps
Print speed: 160 cps
Max chars/line: 136 in compressed mode
Paper width: 4-10 inch
Paper feed: push feed tractor, revolving platen
Buffer size: 1K
Ribbon type: multistrike
Grahics modes: Multiple graphics resolution, IBM or Epson compatible. Switch selectable.
Interface: Centronics – style 8 – bit parallel
Features: B/W reverse image print; built-in push feed tractor; paper out sensor, character sets switch selectable; full duty cycle; prints graphs/diagrams; short tear-off mechanism; bi directional in text mode; hexadecimal byte format in text printing
Options: 8k buffer; RS232C serial interface
Retail price: $1331

MULTI-MODE.
MULTI-PERFORMANCE.



... AT A TOUCH

KX-P1592
KX-P1595

Introducing the panasonic range of top quality printers.

These high performance Dot Matrix Printers with bi-directional printing and logic seeking capabilities, offer multiple mode printing . . . at a touch.

These versatile printers provide Draft, Near Letter Quality (NLQ), and proportional printing modes, as well as offering graphics capabilities for charts, graphs etc all . . . at a touch.

The Full Character Pitch Feature (10, 12, 15, 17 cpi and Proportional spacing is both Draft and NLQ mode) allows any printout styles . . . at a touch.

All this and complete IBM compatability too!

KX-P1592 (136 COL)	180 cps in Draft mode, 38 cps in NLQ mode.
KX-P1595 (136 COL)	240 cps in Draft mode, 51 cps in NLQ mode.
KX-P1092 (80 COL)	180 cps in Draft mode, 28 cps in NLQ mode.
KX-P1091 (80 COL)	120 cps in Draft mode, 24 cps in NLQ mode.
KX-P1080 (80 COL)	100 cps in Draft mode, 20 cps in NLQ mode.
KX-P3151 (132 COL)	22 cps printing speed. Daisywheel printer

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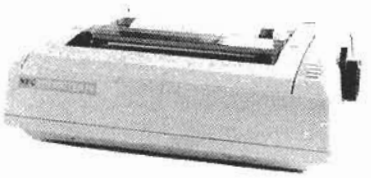
PRINTERS

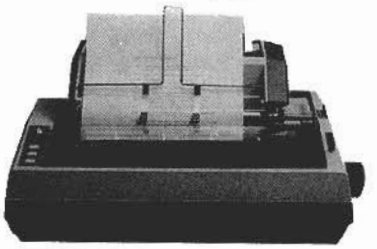
$2000 and under

NEC P6



Dot matrix – optional colour
Pins in print head: 24
NLQ feature: yes
Print speed in
NLQ mode: 76 cps (average)
Print speed: 216 cps
Max chars/line: 80
Paper width: 254mm (10 inch)
Buffer size: 8.0k standard
Ribbon type: endless loop, black fabric
Graphics modes: 360 x 360 dots per in
Interface: parallel centronics or serial RS232
Features: 19 resident fonts – standard; low acoustic noise – 56 dBA; quiet mode reduces noise to 53 dBA;
Options: Unidirectional tractor bidirectional tractor, cut sheet feeder
Retail price: $1431 ex tax
Agent: NEC Information Systems

FACIT 4513



Dot matrix
Pins in print head: 9
NLQ feature: yes
Print speed: 160 cps/84 lpm at 10 cpi
Max chars/line: 132 at 17 cpi
Paper width: 4-11 inch
Paper feed: Removable tractor and friction feed
Buffer size: 2K
Ribbon type: Cloth cassette
Graphics modes: Bit-image up to 240 dpi
Interface: RS232 serial and Centronics parallel
Features: IBM/Epson compatible.
Options: Sheet feeder, current loop
Retail price: $2000 plus GST
Agent: Northrop Instruments & Systems Ltd

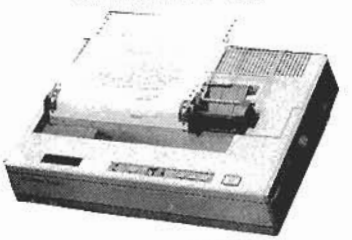
SEIKOSHA MP5300/1300 AI

Dot matrix
Pins in print head: 9
NLQ feature: yes
Print speed in
NLQ mode: 50 cps
Print speed: 300 cps
Max chars/line: 165 for 1300 AI
224 for 5300 AI
Paper width: 11"/1300AI
15.5"/5300AI
Paper feed: front and rear
Buffer size: 10k
Ribbon type: Nylon multistrike
Graphics modes: FX IBM Bit
Interface: serial RS232
Centronics parallel
Features: quiet 59 DCB
Options: cut sheet feeder
colour kit for 1300AI
Retail price: 1300AI $1490
5300AI $2000
Agent: Mitsui Computer Systems

NEC – ELF

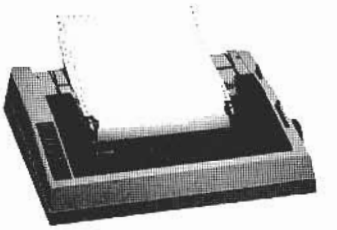
Spinwriter
Print speed: 19 cps
Max chars/line: 110 characters
Paper width: 11 inch (280 mm)
Buffer size: 3.0 K
Ribbon type: multistrike, fabric cartridges
Interface: parallel & serial standard
Features: up to 128 characters on thimble; MTBF – 2500 hours; forward & reverse line feeds; 1-3 part forms; Word-processing functions
Options: cut sheet feeder, bidirection tractor
Retail price: $1155 ex tax
Agents: NEC Information Systems,

CANON F-60



Serial thermal transfer printing
Pins in print head: 26 thermal elements vertically
NLQ feature: yes
Print speed in
NLQ mode: 40 cps, 20 cps in L Q
Print speed: 80 cps in draft
Max chars/line: 188
Paper width: 297mm (12")
Paper feed: cut sheet
Buffer size: 2K
Ribbon type: carbon thermal tranfer (4 colours avail)
Graphics modes: 180 x 180 dots/inch
Interface: parallel (serial option)
Features: silent letter quality on plain paper using thermal transfer carbon ribbon including graphics,
Options: tractor feed, cut sheet feeder, serial 1/F card, font cartridges
Retail price: $1632 plus GST
Agent: Canon Data Products

FACIT 4510



Dot matrix
Pins in print head: 9
NLQ feature: optional
Print speed: 120 cps/55 lpm at 10 cpi
Max chars/line: 132 at17 cpi
Paper width: 4-11 inch
Paper feed: detachable tractor and friction feed
Buffer size: 2K
Ribbon type: Cloth-type casette
Graphics modes: block and pin graphics
Interface: RS232 serial and centronics parallel
Features: multi font capability, self test, solid and robust
Options: current loop, NLQ mode
Retail price: $1662 plus GST
Agent: Northrop Instruments & Systems

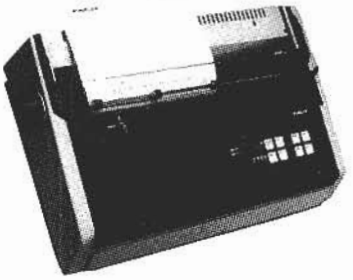
PRINTERS $2000 and under

CANON B J 80

Silent nonimpact bubble-jet printing

Pins in print head:	24 dot
NLQ feature:	yes
Print speed in NLQ mode:	110 cps
Print speed:	220 cps draft
Max chars/line:	132
Paper width:	203.2mm (8")
Paper feed:	built in tractor feed, roll holder, or cut sheet
Buffer size:	2K input buffer
Ribbon type:	ink cartridge
Graphics modes:	480 bit to 1920 bit image mode
Interface:	8 bit parallel, (PC – interface compatible)
Features:	ink cartridge 6 million chars,
Retail price:	$1664 plus GST

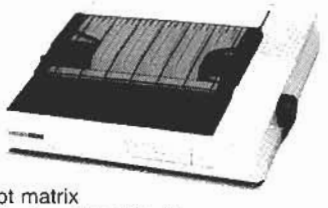
FACIT D2000



Daisy wheel

Print speed:	30 cps 3a text at 12 cpi
Max chars/line:	116 at 10 cpi
Paper width:	up to 15 inch
Paper feed:	friction, sheet & tractor feed optional
Buffer size:	2K
Ribbon type:	fabric, multistrike & single strike
Interface:	Centronics parallel or RS-232 serial
Features:	IBM PC character set, Diablo 630 command set.
Options:	Sheet feeder, tractor feeder
Retail price:	$1672 plus GST
Agent:	Northrop Instruments & Systems Ltd. PH (09) 545-065

CITIZEN MSP-20



Dot matrix

Pins in print head:	9
NLQ feature:	yes
Print speed in NLQ mode:	50 cps
Print speed:	200 cps
Max chars/line:	136 in compressed mode
Paper width:	4-10 inch
Paper feed:	push feed tractor, revolving platen
Buffer size:	8K
Ribbon type:	Multistrike
Graphics modes:	Multiple graphics resolution, IBM or Epson compatible, Switch selectable
Interface:	Centronics – style 8 – bit parallel
Features:	B/W reverse image print;
Options:	RS232C serial interface
Retail price:	$1811

CITIZEN MSP-15

Dot matrix

Pins in print head:	9
NLQ feature:	yes
Print speed in NLQ mode:	40 cps
Print speed:	160 cps
Max chars/line:	231 in compressed mode
Paper width:	4-16 inch fanfold; 4-15 in pre-cut
Paper feed:	push feed tractor, revolving platen
Buffer size:	1K
Ribbon type:	Multistrike
Graphics modes:	Multiple graphics resolution, IBM or *Epson compatible*, Switch selectable
Interface:	Centronics – style 8 – bit parallel
Features:	B/W reverse image print; built-in push-feed tractor; paper out sensor; character sets switch selectable; full duty cycle; prints graphs/diagrams; short tear-off mechanism; bidirectional in text mode; hexadecimal byte format in text printing
Options:	8k buffer; RS232 serial interface
Retail price:	$1811

C.ITOH 8510S

Dot matrix impact

Pins in print head:	9
NLQ feature:	yes
Print speed in NLQ mode:	30cps
Print speed:	180cps/106lpm
Max chars/line:	80 at 10 cpi, *136 at 17cpi*
Paper width:	4.5-10inch
Paper feed:	Push tractor, friction
Buffer size:	2 K
Ribbon type:	Inked fabric cartridge
Graphics modes:	C.Itoh graphics upto 144(V) x 160 (H) dpi or Epson/IBM graphics
Interface:	Centronics parallel or RS-232-C
Features:	Well proven, very reliable printer.
Options:	auto sheet feeder
Retail price:	parallel $1750.00 RS-232-C $1850.00
Agent:	Control Microcomputers, PO Box 68-474, Auckland, PH (09) 600-687

NEC P7

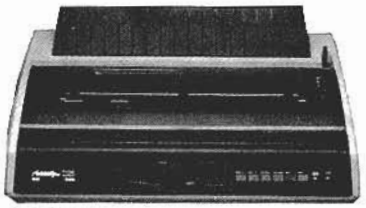
Dot matrix – optional colour

Pins in print head:	24
NLQ feature:	yes
Print speed in NLQ mode:	76 cps
Print speed:	216 cps
Max chars/line:	132
Paper width:	406 mm (16 inches)
Buffer size:	8.0 K standard
Ribbon type:	*endless loop, black* fabric
Graphics modes:	360 x 360 dots per in
Interface:	parallel interface or serial RS232
Features:	19 resident fonts – standard; low acoustic noise; optional colour
Options:	unidirectional tractor, bidirectional tractor, cut sheet feeder
Retail price:	$1863 ex tax
Agents:	NEC Information Systems

PRINTERS

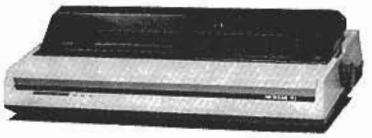
$2000 and under

DIABLO D25



Printwheel
Print speed: 25 cps
Max chars/line: 132
Paper width: 15 inches
Paper feed: back
Buffer size: 521 bytes
Ribbon type: multistrike
Grahics modes: IBM
Interface: API all purpose interface
Features: quiet 59 dcb; long term reliability; 70 typestyle on 96 char plastic P/W
Options: cut sheet feeder
Retail price: $1891.00
Agents: Mitsui Computer Systems

OKI MICROLINE ML193



Dot matrix
Pins in print head: 9
NLQ feature: 17 x 17 dual pass
Print speed in
NLQ mode: 33 cps
Print speed: 160 cps
Max chars/line: 233
Point sizes: 5,6,8.5,10,12,17.1
Paper width: 15 inch
Paper feed: rear or bottom
Buffer size: 8K standard 16K optional
Ribbon type: fabric cartridge
Graphics modes: either block or APA utilising single, double or quad density
Interface: Standard as parallel
Features: optional cut sheet feeder in either 10 or 15 inch size (A4 thru B4);
Options: Serial RS232 and RS422 interfaces along with current loop option
Retail price: $1899
Agents: AWA (NZ) Ltd

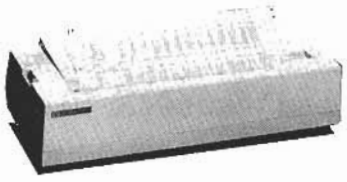
CANON PW1156A

Dot Matrix
Pins in print head: 9 wires vertically
NLQ feature: yes
Print speed in
NLQ mode: 30 cps
Print speed: 160 cps
Max chars/line: 265
Paper width: 431mm (17")
Paper feed: built in tractor feed, roll holder, or cut sheet
Buffer size: 3K input buffer (selectable) 2K print buffer
Ribbon type: multistrike
Graphics modes: from 60 dots/inch to 240 dots/inch
Interface: parallel (serial optional)
Features: 12 month warranty
Options: additional NLQ font rams available
Retail price: $1900 plus GST
Agents: Canon Data Products,

CANON PJ1080A

Silent, non impact, seven colour ink jet
Print speed: 37 cps
Max chars/line: 80
Paper width: 216mm (8½ inch)
Paper feed: cut sheet or roll
Ribbon type: dual ink cartridges, black and three primary colours
Graphics modes: 9 dots x 640 dots/line
Interface: 8 bit parallel (PC compatible)
Features: silent, seven colour print. Can produce OHP transparencies 12 month warranty.
Retail price: $1900 plus GST
Agent: Canon Data Products

HEWLETT PACKARD 2227A



Dot matrix
Pins in print head: 12 vertical
NLQ feature: Yes
Print speed in
NLQ mode: 48 cps
Print speed: 160 cps in 10 cpi 192cps in 12 cpi
Max chars/line: 158, 12 pitch – 132, 10 pitch – 281, compressed
Point sizes: 5,6,10,12,21.3
Paper width: 4 through to 15 inch (10.2cm-38.1cm)
Paper feed: tractor & manual
Buffer size: 2K bytes
Ribbon type: inkset
Graphics modes: IBM & HP graphics
Interface: both Centronics and RS232 serial
Features: 50dB quiet compact print head replaced when cartridge replaced
Retail price: $1998
Agents: Hewlett Packard (NZ) Ltd

Printer Round-up continues next month

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RURAL COMPUTING PART 2

Does a farm computer pay?

by Peter Nuthall

Kellogg Farm Management Unit, Lincoln College

In good time every primary producer will be using a computer as an aid to managing a property. The extent of the use will depend on the producer's objectives, skills and indebtedness level. Increasingly, economic pressures will force farmers to seek every means at their disposal to improve efficiency, and one of these will be the provision of decision information through computers. Good and timely information is clearly the key to successful management.

The change will be dramatic and far-reaching. Consider the effect the internal combustion engine had on productivity in primary production. At long last the office side of management has a machine to assist the process of production, and while the impact will not be as visually obvious as the tractor, it will be just as significant.

Back to the present. Only a fraction of New Zealand managers use a computer and only some of these use it effectively. It took decades for tractors to be accepted and widely used. A similar uptake rate will occur with computers, although the time span will not be as great. It requires a reasonable level of training and expertise to effectively use a computer, and many old hands will not have the incentive or desire to pick up the new skills.

This does not mean the country should ignore the development of training programmes wherever possible. Indeed a co-ordinated and well-researched country-wide programme should be given high priority to reduce the uptake rate to the minimum possible.

But does a farm computer pay? Some of the pioneers involved with the introduction of cars might have asked the same question. Despite any answer that might have been calculated, cars were introduced anyway due to the significant effect they had on our way of life. Computers can be placed in a similar category. While currently computers do not pay on many farm situations (owing to the costs, the lack of opportunities to make use of the results, lack of training...), the nature of the machine and its associated software means it will eventually be economic on nearly all properties. Research and development will ensure this.

What does a computer cost?

Current figures suggest the annual cost of owning a business computer varies between about $1200 and $4200. The variation depends on whether income tax is paid and whether time is a scarce resource. These costs assume a five-year replacement period for the computer and an interest rate of 15 per cent.

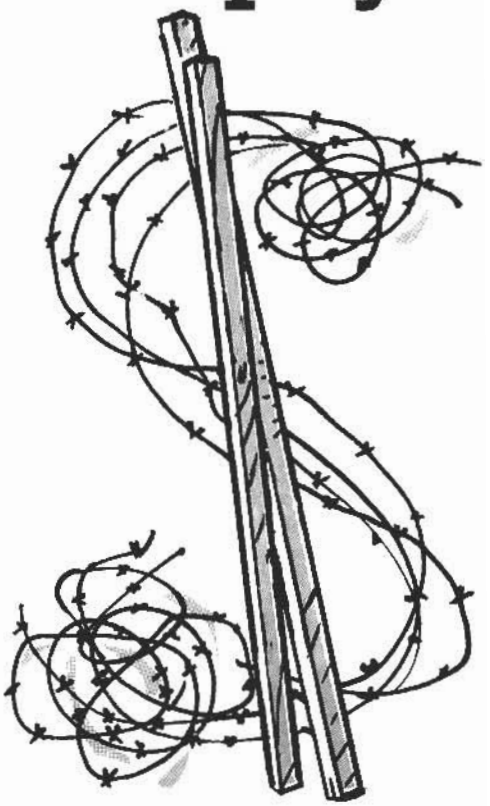
The figures

Direct costs on, for example, a computer and printer worth $3,600 amount to just over $1,000 for interest and payback; $300 for interest on software; $350 for disks, electricity, ribbons and paper; $450 for repairs and software maintenance, and $100 for insurance. Labour costs are payable if additional help is employed to free up the manager, and amount to something like $536 for initial computer search and learning time (200 hours at $9 per hour, amortised over five years); and annual operating time of about $1,300, assuming four hours worked per week.

> Only a fraction of New Zealand managers use a computer

If the computer and printer capital cost drops by $1000 annual cost drops by $298, whereas if the capital cost increases by $1000 the annual cost increases by $298. Also carefully note that many of the costs are tax deductible. If the capital cost is borrowed, all but the loan repayments can be deducted.

Who can cover these costs? Producers with spare time have an advantage as the labour costs are not relevant. Clearly, larger properties with management opportunities should be those looking to a computer, particularly where there is a keen desire to improve efficiency and a willingness to put the time in. Producers who do not currently keep hand-worked records and cash flows are unlikely quickly to succeed. In general, these producers are best advised to start with pencil and paper methods and learn new management skills before embarking on the computer option.



Studies on the economics of computers have yet to be carried out. The short time they have been used precludes the collection of factual data. Surveys indicate, however, that approximately 70 per cent of producers using computers maintain that their computing costs are more than covered. One producer, when reviewing his use of a financial package, writes:

"Has it been worthwhile? For us it certainly has.

1. Its greatest value is that it has enabled us to keep an up-to-date budget, which we revise every month, and which we use to reflect our projected income and future development expenditure, as well as our normal operating expenses.

2. It has enabled us to talk to our bank manager with confidence. We have known exactly what we want, what help we need from the bank, for how long, and what we believe we can repay. With a detailed budget in front of him, we have never had a request for a loan, or for a change in the repayment terms, turned down.

3. And it has certainly been cost effective. Last year we paid our accountant $200.00 for the work he did. If we had not had the system we would have paid in accounting fees $600.00 for preparing the annual accounts, together with a fee of at least $50.00 a month for a record of each month's expenditure, and as much again for updating the forward budget. And we certainly would not have had the results two days after every month's end.

4. But above all, knowing where we stand, where we plan to go, and what action we may need to take to achieve our financial goals, has a value that cannot be measured in just dollars and cents. The financial package has given us the ability to forecast, measure, and revise our project as needed. For us the possession of a personal computer with a really good software package has given us a Peace of Mind that far outweighs its original purchase price."

If a rule of thumb is required, producers with a gross income of $100,000 plus should look carefully at computers, as a five per cent increase, which should be achievable, gives $5000.

Careful attention

Instant success, however, is seldom achievable. Comments from primary producers using computers make it abundantly clear that the initial step of purchasing a computer is only the beginning. Potential, and new, users should take heed that an appreciable time input is necessary to obtain benefit from a computer and its all-important driving software. Surveys of users indicate as much as six or seven hours per week are spent at the keyboard, and for this time to have a payoff, careful attention must be given to how it is spent.

Users frequently comment on how they underestimated the time taken to learn the skills necessary to use this new technology. There is no reason why a rational human being should assume that changing the whole approach to management should be painless and timeless, but so often this occurs. This optimistic trait does, however, have its benefits in that many projects would never be started if hindsight was the decision maker.

For efficient use, a regular time period must be set aside for computer-associated management work. Initially this involves learning to use the computer and software packages, but once these skills are acquired and the packages configured to suit the

particular property, a regular time slot is necessary for entering data and obtaining management reports.

It seldom works if these tasks are left until a rainy day. To be effective, decisions must be made on time. This means data bases must be kept up-to-date, thus allowing contemporary reports to be produced when they are needed. Without these, the benefits of timely decision making can't be reaped.

Making a regular time slot available frequently means it is necessary to re-organise other tasks. This may mean employing extra assistance. This could come from a member of the farm household. Alternatively, bringing a spouse into some form of partnership may provide the extra time as well as a very valuable involvement and interest of the partner. Whatever arrangement is most appropriate, the cost of extra time should be included in the initial assessment of whether a move into computer-assisted management is economic.

Even with a re-organisation some producers will find it difficult to gain benefit from a computer, as not everyone has an aptitude for sitting at a screen and keyboard. In these cases thought should be given to the use of professionals, particularly when GST is introduced in New Zealand. These might be farm secretaries, accountants or consultants.

If you believe a move into computer technology is appropriate the next question is – what type? There are clearly exceptions to every rule but the current costs of IBM style computers and, most importantly, the very wide range of good software available for these machines means they are hard to go past. For most farm and horticultural situations a

> ".. has a value that cannot be measured in just dollars and cents"

256Kb, dual 360Kb drive machine with a printer capable of 132 columns will serve most situations adequately. Greater memory and a hard disk improve the efficiency of computing greatly, but in most cases are difficult to justify on a cost basis.

Then comes the software question. Currently, reasonable software to achieve most requirements is available. The software has certainly not reached anywhere near what is possible, nor is it as integrated as it might be, but for the enthusiastic manager it will certainly produce good management information.

One of the problems with software is the cost of development and the size of the market. Think of some of the internationally available spreadsheets – systems that have large development teams with the world as their oyster. Not so specialist New Zealand agricultural software. This means the software will not be as sophisticated as otherwise it might have been. It also means in the longer run that the number of groups supporting good software will not be large. When selecting both hardware and software it is crucial to be assured of easily accessible support. This does not have to be physically close by, though this is clearly an advantage, but it should be at the end of a phone as a minimum. If there are other users of the same hardware and, most importantly, software nearby this is also an advantage. Primary producers tend to help one another.

In the end, primary producers will all have computers that are connected to larger machines for distributed processing. The systems will be very much easier to use than those currently available and will be quite within the reach of all producers, both economically and technically. The result will be increased efficiency in the management of the nation's scarce primary producing resources. ☐

The software writers

by Neil Rennie

Not enough time available to spend learning and doing the necessary data entry is by far the biggest barrier to widespread use of computers by farmers. This rapidly becomes apparent from the brief survey of farmers quoted here, and confirms my own experience gained from writing about farmers and their work for the last 13 years.

Rory Sherlock, Ngaruawahia, hill country farmer: "To keep those things (his detailed records) going requires a time input which most farmers would not be prepared to do. You'd be lucky if 10 to 15 per cent were prepared to use it this way. Once GST comes in, more farmers will be interested in computers for the financial side – budgets and cash books."

John and Megan Glasson, Helensville, dairy farmers: "We bought the Commodore cold, hoping to have time to use it, but with young children it's very difficult. There are lots of areas where the computer could help – but the problem is finding the time to sit down and work at it."

Alan Moore, Helensville dairy farmer agrees: "It's a time-consuming thing."

One of the best ways of overcoming this problem of lack of time is of course to make use of the talents of farm wives. Farming has always been a partnership, but the increasing number of husband/wife business partnerships in farming now recognises this formally. Running the business and records side of the farm is one of the best contributions the farm wife/partner can make.

John Glasson: "Megan uses it – I just play games on it." All this simply reflects the fact that farming well is a complex and demanding task with a mix of physical and mental skills few other jobs demand. Not surprisingly, farmers who have spent a long day on the physical side of the job find it hard later to sit down and work on the mental side, keeping records and accounts. And it doesn't really matter whether these are kept manually or on a computer, the problem still exists.

The computer has an enormous amount to offer in farm management because of its ability to handle large amounts of data. At the same time, it's an extremely complex tool and can take years to learn to drive properly. Just as importantly, gaining the full benefit of its data recovery and comparison abilities requires at least months and often years of records, all of which have to be inputted first.

Farmers who have bought computers and stuck at it until they have gained confidence in using the machine, and have loaded sufficient data into it to enable them to manipulate figures and make useful comparisons, have found the computers the exceptionally useful management tool they promise to be.

Roy Sherlock: "I use it to keep cattle records, and also financial recording and feed budgeting. I've developed my own feed allocation and stock management program. I wouldn't like to revert to a manual system."

Alan Moore: "I started with doing my own accounts program. Then I built in word processing, spreadsheet, graphics, database and file handling. I use it for cow records, and also the football club and Scouts."

Confidence

From these comments and my own experience of farmers using computers, one of the secrets of making a system work is: don't be too ambitious at first. Start in a limited area of the farm operation – say accounts or livestock records (just one breed initially) and master that before trying anything else. Competence in one area gives you the confidence to move to another.

One alternative which overcomes some of the problems of farmers not having enough time to use a computer themselves is for them to use bureau services. Ray Hollis, of Hollis and Scholefield, Warkworth, farm consultants and valuers: "We provide a client service. Farmers fill in forms to provide the data. We do monthly accounts, which allows us to indicate trends in the pattern of the farm's business. From the farm management point of view this is more useful than taxation information which you get from straight accountancy information.

"We would expect the farm's accountant to have less work because of the good financial documentation the service provides."

Lack of suitable software has obviously been the other major barrier to computer use on farms.

This isn't surprising. It's true of all software programs intended for

Actually, he's playing 'Dung Invaders'.

specific applications that the best people to write them are not computer programmers but people whose primary experience is in doing the job the software is intended for.

Practising farmers

Put simply, that means the best people to write farming software are practising farmers or farm management consultants. Naturally this takes time, but the software is being developed.

An example is Philip York, a Clevedon dairy farmer who is developing a pasture management program in conjunction with his partners Nico Sieling, another farmer, and programmer Brian Fordray. He uses Meridian for accounts on his Commodore 64 ("It gives a set of accounts better than my accountant can give me – it's rather annoying when he gives me the same thing and charges me for it."), and is emphasising simplicity and ease of use for the thousand or so Commodores known to be out there on farms.

Their program is aimed initially at dairying, but will be available for sheep, beef, and other pastoral farmers. "We're on the verge of a revolution, but it's a hardware problem. I want to put the machine in the cowshed, to read eartags, monitor temperatures and other factors, but it's a very high unit cost."

Philip York is determined that the package will be thoroughly debugged before being sold. "Until the thing's right it's pointless doing anything. We're concerned that nothing goes out until it's finished. Too many programs are sold before they're properly up and running."

Another good example of program writing from within the agricultural sector is Primesoft Farm Plan (NZ) Ltd. This started off as two separate farm software writing businesses – in Timaru and Christchurch – which later joined together and moved to Auckland, the centre of the country's computer industry, but the key point is that all the people involved were farm management consultants before they took up computer programming.

Tony Lissaman of Farm Plan: "the computer is a vehicle for handling a large volume of material for detailed analysis. A farmer requires much more detailed information to run his business than the accountant requires. We have worked on this strategy from the beginning.

> Competence in one area gives you the confidence to move to another.

"It must be recognised that the average farmer has had no formal business training – so one of the things he or she faces is learning the discipline of picking up records in a practical way which makes the effort worthwhile."

A criticism of farmers and their expectations of software and hardware is that too often they expect Formula I racer performance from Mini-Minor money. If a farm computer is to adequately handle all the complex tasks involved in running a farm it will require reasonable processing power and data storage capacity. And that involves investing a certain amount of capital.

Tony Lessaman: "In good times farmers never put money into things that make money. They'll buy a $35,000 car when a $20,000 one will do, and they could put the difference into a $7000 computer and make enough money to earn a $35,000 car later."

In today's depressed farming climate, farmers will naturally ask: "Can I afford a computer?"

I tend to feel that with the obvious emphasis now on efficiency in both the physical and business management sides of farming, the real question increasingly will be: "Can anyone afford not to?" ☐

Controlling the reset key

by Paul Left

This month we will look at using the Apple II's Reset interrupt to force the machine to run your own program. The example program we will use is a short utility for printing out a copy of the high-resolution screen on a dot-matrix printer. The routine will work for you if you have an Epson-compatible printer (for example, a Panasonic or Super-5) and an interface card which will send an image of the high-res screen to the printer when the appropriate character is received.

The routine (which turns on the printer card, sends it a Control-Q, and turns the card off again) will work with most parallel cards, and is easily modified to send a different command to the printer card if necessary. If you have an Apple II and a dot matrix printer, you will be able to produce hardcopy of high resolution graphics displayed by your favourite programs. You will also learn how to take control of the Control-Reset interrupt, either to run a machine-language program of your choice or to protect your own programs from this type of interrupt.

Disabling Control-Reset is one way in which nearly all commercially-sold programs are protected from copying, as otherwise it is simple to interrupt a program while running and SAVE (or BSAVE) it to disk. Most software sets up the Apple to reboot the disk in drive 1, while some force a return to the beginning of the program without accessing the disk. A few programs make life a ltte more difficult by checking the disk to make sure it is the correct one, and then reloading part of the program.

All these schemes are not there to stop you getting a printed copy of the high-resolution screen, of course; they are to stop the program being copied. To achieve our much more innocent aim, we need to carry out these steps:

- interrupt the program while the correct screen is displayed; and
- send the image to the printer.

Let's look at the second step first, as this is the more straightforward. Listing One shows a short machine-language routine which displays the high-resolution screen (as the interupt process often causes the text screen to be displayed), waits for a keypress (pressing ESC forces a return to BASIC), and sends the screen to the printer. This allows you to change your mind if you don't like what you see, as it can be difficult interrupting the software at just the right moment. Notice that the routine starts at address $300 (the '$' shows the number is hexadecimal) or 768 in decimal. There is a short segment of free memory starting at this address which is available for your own routines.

If you are not familiar with entering machine-language programs, you may prefer to use Listing Two, which is a BASIC program using the POKE command to enter the code for you and then deleting itself (with a NEW) from memory to leave the dump routine intact.

Lines 10 to 100 are merely REMARKS, which can safely be omitted. Lines 110 to 130 print explanatory messages on the screen, while lines 170 to 190 POKE the code into RAM. The code (in decimal notation) is stored in the DATA statements in lines 220 to 270.

Once the program is run, the routine is ready to be used. The normal procedure is to use the CALL command, followed by the start address of the routine. In this case, the routine can be accessed by typing CALL 768 (remember, 768 decimal equals $300). You don't need to type any other commands to print out hardcopy of the high-res screen, as the routine does it all for you. If your printer interface uses a different control-character to start the dump, you will need to substitute the correct value for the '145' in the DATA statement in line 240. Calculate the new value by adding 128 to the ASCII code of the character to be sent.

Another way of calling a machine-code routine is by using the ampersand vector. The Apple has another short segment of addresses set aside for the user (although the Applesoft manual states that it "is intended for the computer's internal use only...") which starts at $3F5 (1013 in decimal). When the Apple receives the '&' character (called an ampersand), it passes control to this address. There is just enough room here to store machine code commands which pass control again to our routine at $300. The tiny routine at $3F5 is called a vector because it points to another address in memory.

Look again at Listing Two, line 150. The four statements in this line, roughly translated, say "go to $300". Normally, the routine at $300 would return back to the vector when finished and the value 96 (address 1013) would return to wherever you were when the '&' character was issued. However, in this case the routine does not return to the vector when finished, but returns directly to the BASIC/DOS interpreters.

It does not matter what routine is used or where it is stored – the vector at $3F5 can be used to access it in response to the '&'. That means you can store your own short machine-language programs at $300, where they will not interfere with a BASIC program in memory.

It also means you can store a machine-language program elsewhere in memory and access it with '&' as long as the correct values are stored in addresses 1013 to 1016. You need to take the last two characters of the start address (in hexadecimal), convert to decimal, and POKE into 1014. The first two characters converted to decimal are POKEd into 1015. With a 32 in 1013 and a 96 in 1015, your vector should be set up to point to your program.

There are three more POKEs which are not included in Listing Two, but which you might like to add:

```
155 POKE 1010,245
    :POKE 1011,03
    :POKE 1012,166
```

This addition to the BASIC program sets up another vector which points in turn at the vector at $3F5. These three addresses tell the Apple what to do when a Control-Reset interrupt is received. The first two bytes store the address to which control is to be passed: in this case, our vector at $3F5. However, this will only happen if the third byte has a particular value. The value at 1011 is exclusive-ORed with the value $A5 and compared with the value at 1012. If there is no match, the Apple assumes that it has just been turned on, clears the screen, displays the 'APPLE II' message, and boots the disk.

AS DOS sets these bytes to its own values, the next time a Control-Reset is encountered a match is found and the Apple passes control to the address stored in 1010 and 1011. Our new line 155, then, sets up the Reset vector to point to $3F5 and hence to our printer routine at $300.

We now have a utility program which will print a hardcopy of the high-res screen and which can be accessed in any of three ways:

- by typing CALL 768 from BASIC;
- by typing & from BASIC; or

- by pressing Control-Reset at any time during the running of a program.

Try loading the routine using the program in Listing Two (including line 155) and then running a program which draws on the high-res screen. As long as the program has not altered the routine or the vectors, you will be able to interrupt the program and get hardcopy quickly and easily.

Now try booting a commercial disk. Once the program has loaded, press Control-Reset. You will probably find that the protected software has altered the Reset vector to cause the Apple to reboot the disk, which will alter the image on screen and overwrite our screen-dump routine. You will need to swap disks to avoid this, and a convenient arrangement is to set up a disk which will RUN our BASIC program when booted. To do this, start with a normal DOS and LOAD the program in Listing Two. Change line 200 to read:

200 GET G$: &

Now place a blank disk in the drive and type INIT PRINTER. This will cause the program to be placed on the new disk as the HELLO or startup program. Now reboot the protected software. This time, when the program has loaded, remove the disk and insert your PRINTER disk. When the image on the screen is what you want, press Control-Reset. This will cause the Apple to boot your PRINTER disk and load and run the dump routine at $300.

When you have finished reading the BASIC program's messages, press any key. The high-res screen will be restored to view, and will be sent to the printer when you press a key other than ESC. Your PRINTER disk, by the way, can be used for storing other files in the usual way.

You should now have the knowledge to set up the Reset vector and the ampersand vector at $3F5 to suit your own purposes, and you should also have a simple but useful high-res screen dump utility. By POKEing the correct values into the ampersand vector you can cause the BASIC interpreter to pass control to a machine-language program. The Reset vector allows a Control-Reset to do the same or to cause a disk-boot, depending on the values found in the vector. Control of this vector is an essential first step in protecting programs from being listed or copied and provides the programmer with greater flexibility and power over the Apple II.

Listing one

```
0300-   2C 50 C0     BIT   $C050
0303-   2C 57 C0     BIT   $C057
0306-   2C 10 C0     BIT   $C010
0309-   AD 00 C0     LDA   $C000
030C-   10 FB        BPL   $0309
030E-   C9 9B        CMP   #$9B
0310-   F0 0F        BEQ   $0321
0312-   EA           NOP
0313-   2C 10 C0     BIT   $C010
0316-   20 34 03     JSR   $0334
0319-   A9 91        LDA   #$91
031B-   8D 00 C0     STA   $C000
031E-   20 ED FD     JSR   $FDED
0321-   A9 00        LDA   #$00
0323-   8D 10 C0     STA   $C010
0326-   A9 BD        LDA   #$BD
0328-   85 36        STA   $36
032A-   A9 9E        LDA   #$9E
032C-   85 37        STA   $37
032E-   2C 51 C0     BIT   $C051
```

Listing two

```
10    REM ************************
20    REM *  SET UP HIRES DUMP   *
30    REM *  AT $300 (768) AND   *
40    REM * VECTOR AT $3F5 (1013)*
50    REM ************************
60    REM
70    REM ************************
80    REM *  PAUL LEFT  31/08/86 *
90    REM ************************
100   REM
110   TEXT
    : HOME
    : PRINT "HIRES SCREEN DUMP INSTALLE
      D."
120   PRINT
    : PRINT "ACCESS BY TYPING '&' <RETU
      RN>"
130   PRINT
0331-   4C D0 03     JMP   $03D0
0334-   A9 00        LDA   #$00
0336-   85 36        STA   $36
0338-   A9 C1        LDA   #$C1
033A-   85 37        STA   $37
033C-   60           RTS
    : PRINT "PRESS 'ESC' TO CANCEL WHEN
      HI-RES SCREENIS DISPLAYED."
140   REM  POKE VECTOR
150   POKE 1013,32
    : POKE 1014,00
    : POKE 1015,03
    : POKE 1016,96
160   REM  POKE DUMP ROUTINE
170   FOR ADDRESS = 768 TO 828
180   READ CODE
    : POKE ADDRESS,CODE
190   NEXT ADDRESS
200   NEW
210   REM  CODE
220   DATA  44,80,192,44,87,192,44,16,1
      92,173,0
230   DATA  192,16,251,201,155,240,15,2
      34,44,16
240   DATA  192,32,52,3,169,145,141,0
      ,192,32,237
250   DATA  253,169,0,141,16,192,169,18
      9,133,54
260   DATA  169,158,133,55,44,81,192,
      76,208,3,169,0
270   DATA  133,54,169,193,133,55,96
```

Spectrum machine code

by Gary Parker

Lately a few people have asked me to teach more about machine code, so this month's column contains a simple machine code routine with a detailed explanation of how it works. I won't attempt to teach an entire course on machine code from scratch, as that is a little beyond the scope of this column and might bore some readers. If you want to learn to program in machine code, I suggest that you buy a book on the subject. There are some good, reasonably-priced Spectrum machine code books around.

Machine code needs to be stored in an area of memory where the Spectrum's interpreter can't get at it and try to interpret it as a Basic program. There are quite a few possible areas, but for this routine I have chosen the printer buffer since it is easy to use. The only limitations are that you can't store machine code programs of more than 256 bytes there (which is quite a reasonable length for a machine code program), and you can't use a ZX printer, or your machine code will be lost.

To begin with, you need a Basic program which will load your machine code into the printer buffer. Listing 1 is a simple example. It will accept whatever numbers you enter and POKE them into memory. When you have entered all the machine code of your machine code routine, simply enter STOP (on the A key) the next time it asks for input.

Listing 2 contains a routine which will scroll all the attributes – the colours and so forth – of the screen one character space right. This means that you can make colours appear to move behind stationary characters. I've included the routine here because it uses simple machine code and so is a good routine to explain first.

To enter the routine, first type in Listing 1. RUN it, and enter the numbers in the right-hand group of Listing 2. Enter each number one at a time, separated by ENTER. When you have entered the 23 numbers, finish with STOP. Then to use the routine, call it with LET x=USR 23296. The variable x can be any variable you're not using.

So how does it work? The left-hand side of Listing 2 contains the assembly language of the machine code on the right-hand side.

First of all, register a is given the value 0. A register is equivalent to a variable in Basic, so making register a equal zero is the same as 'Let a=0' in Basic. Then register c is given the value 22, the register pair hl is given the value 23295, and register b is given the value 31.

Register a holds the attribute to be put into the left-hand column of the screen which becomes blank when the attributes are scrolled right one character. Zero stands for a black square, and you can make other colours appear there by changing this value. There are 22 lines on the screen, and register c is used to count these. Register b counts the number of columns across the screen. The register pair hl holds the address of the last byte in the attribute file, which is the area in memory which holds the details of the screen picture. It contains one byte for every character square on the screen.

Next we enter the loop which actually shifts the screen colours. The value of hl is decreased by one, and the register e is loaded with the number which is in the memory location pointed to by hl. This may sound quite tricky, but it works just like a PEEK in Basic. Register e is given the attribute of the second-to-last square in the attribute file.

Then hl is increased by one. The first time through the loop, it will be made to point to the last attribute square. That square is then given the attribute held by the register e – that is, the attribute that was in the square to the left of it on the screen. Then hl is decreased by one again.

Register b is decreased by one at this point. It counts the number of squares across the screen which have been shifted, and when it reaches zero, one complete line of 32 squares will have been moved across a square. Actually, only 31 squares are shifted, since the final one on the right-hand side is simply replaced with the square to the left of it.

Next, a 'jrnz' command is reached. This tells the computer to jump 8 bytes backwards if the register b is not zero. This command functions like a GO TO in Basic. If register b is not zero, the computer will go back to the first 'dec hi' command, and start there. This forms the loop which shifts one line of the display.

Once register b reaches zero, the computer will go past the jump command. It will load the attribute held by register a into the address specified by hl – that is, it will put a black square into the left-most square of the line which has just been shifted a square right.

Register hl is then decreased by one. Since the screen picture is stored in the attribute file as one long line, decreasing hl by one means that it now points to the first square on the line above the one which has just been shifted.

Next, register c is decreased by one. Remember that register c counts the number of lines that have been shifted. If c is not zero, the 'jrnz' command will jump 15 bytes backwards. This is to the '1d b, 31' command. Here, the computer will begin shifting another line. If c is zero, it means that all 22 lines of the screen have been shifted. In this case the computer will pass the jump command and reach the 'ret' command, which tells it to return to Basic.

In summary, the routine works backwards through the attribute file, taking each square in turn and shifting it into the next one along. It contains two loops. The inner one shifts a line of 32 squares at a time, and the outer one puts a black square into the left-most position of each line, and counts the number of lines which have been shifted.

Isn't it incredible to realise that the computer does all these complex tasks in a tiny fraction of a second?

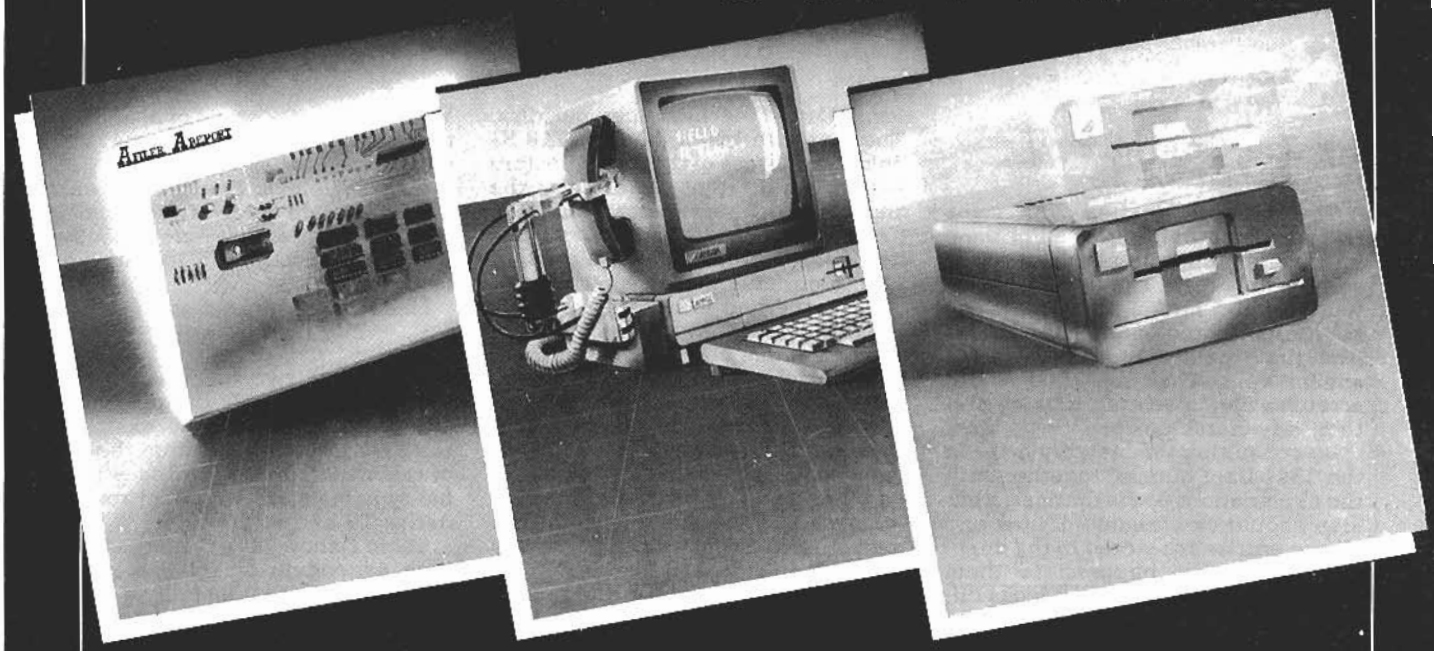
LISTING 1: Machine code loader program

```
10 LET a=23296
20 INPUT m
30 POKE a,m
40 LET a=a+1
50 GO TO 20
```

LISTING 2: Right-scroll (attributes only)

```
ld a, 0              62 0
ld c, 22             14 22
ld hl, 23295         33 255 90
ld b, 31             6 31
dec hl               43
ld e, (hl)           94
inc hl               35
ld (hl), e           115
dec hl               43
dec b                5
jrnz, -8             32 -8
ld (hl), a           119
dec (hl)             43
dec c                13
jrnz, -15            32 -15
ret                  201
```

AMIGA/ST SOFTWARE



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Driving a bit further

by Joe Colquitt

The series continues with some more useful subroutines, all of them for manipulating the status of a chosen file on a disk. The September article showed how a whole disk can be (un)protected, and following on from that, these subroutines are in a similar vein. They are: find a file; scratch a file; unscratch; scratch-protect; un-scratch-protect.

By consulting the memory maps in the 1541 User Manual together with the explanations of the routines, a fair idea should be obtained of how and where entries are stored in the directory, and what happens to them under various conditions. It looks difficult at first glance, but the sequence is logical. Find it, read it, change it, write it.

The directory track is divided into 19 sectors. Sector0 holds the disk name, ID, free block map (BAM), and disk format type. The other 18 sectors hold filename entries, up to 8 per sector; 8*18 = 144 filenames per disk. The first two bytes (0&1) of T18 S1 hold the address of the next directory sector. In turn, that sector holds the address of the next sector, and so on. (Or 00 FF if it's the last directory block used, or it's the last block of data for a program or file. See Line350 below.)

This method is used throughout the disk for finding the next block of a program, file etc. The first entry in the directory starts at T18 S1 byte 2, and subsequent entries at 32 byte intervals, ie at bytes 34, 66, 98, etc. A single entry is shown in Table 1. Bearing this in mind, an explanation of Part 1 should complete the picture.

Lines5-30: get the filename and read data for other subroutines. The filename must be entered in full.

Line35: initialise drive and open a buffer

Lines140-150: read T18 S1 into buffer

Lines170-205: get the first two bytes from T18 S0, set T and S to the next block

Lines 180-340: get names from block and compare to name sought. Variable I does a count of 8, and J 16, the max length of a filename. DELeted names are also got.

Line295: check first char of entry against sought name to save time.

Line350: if the first byte of the sector is 00, then make this the last block read.

Line360-370: print messages

Part 2 has two functions. First it finds the type of file the program is. GOSUB950 does this by examining the byte three bytes before the start of the filename, and returns with the file type in variable F. Later routines derive TY and PR from it.

Table 2 shows the contents of that byte depending on the file type. A protected file is denoted by a < after it in the directory. An unclosed file, caused by various means, is denoted by an *. A menu follows, allowing the user to alter the byte. The subroutines that perform the various functions are similar in operation, so I'll explain just one, UNSCRATCH.

Line675: set the Block Pointer to the byte

Line680: write the new value of the byte into the buffer

Line685: reset the Block Pointer to the start of the block

Line690: write the block back to the disk

Note: using UNSCRATCH makes the file accessible for loading. It does not update BAM. Load the file and resave it to update BAM. Using the SCRATCH function does not update BAM, and blocks reserved for the SCRATCH program are still unavailable for future saves. A Validate command should free up reserved blocks.

The only thing different about the subroutines is the byte value written to the disk. If wished, the two routines from the first article could be added to the menu and overall program.

Notes on typing the program in:

I've arranged the program listing to be in 40 columns, so ignore spaces under line numbers (eg line25)

[clr] is SHIFT/HOME

[down] is CRSR down

[delete] is done by opening up the quotes and pressing DELETE to produce a reverse T. A delete will not show in a screen listing. The deletes are not essential but they do make the screen a bit tidier.

If you would like a copy of these listings and other disk utilities, send a disk and stamped return envelope to me at 6 Martin Ave, Mt Albert Auckland.

Q + A

by Geoff McCaughan

Subject: Modem Connection System: Atari 800 XL

[Q] I have an English program and cable which I use to connect my VMD 312 Modem to the Atari 800 XL. It works on Prestel and 300 Baud, but the terminal is unable to download from Compuserve. To use any other terminal software with the Atari I need the 850 interface which costs $500 in N.Z. Would it be worthwhile upgrading my XL or would it be better to wait for the ST which has a serial port.

[A] It strikes me that $500 is too expensive just for a serial interface, but are you sure there are no other ways around the problem? If one person can solve the problem in software, so can another.

Surely if serial interfaces are that expensive every programmer on the block will be producing software solutions. It may be worthwhile contacting the firm who produced the terminal you are using – they may already have an upgrade that will do what you want.

Buying an ST would certainly give you communications ability, but would not go any closer to getting your XL online than buying (say) an Amiga. The other possibility is third party manufacturers. In virtually every case, if a major manufacturer prices a product too high there will be a bunch of third party manufacturers just waiting to sneak in under the fence.

I'm sorry but I cannot help you more than that.

I suggest you contact local or national Atari user groups, have a close look at local and overseas advertisements to see if anything cheaper can be done, and I would ask any of our readers who can help to get in touch.

Subject: Computer Audio

[Q] How should I connect my computer to my stereo? The computer only has one one audio outlet.

[A] The audio signal from your computer should be compatible with the auxiliary input on your sterio, but unless you've got an Amiga your computer will most likely only produce output on a single audio line.

If you are handy with a soldering iron you can make up a connecting cable yourself by simply sending the single audio line to both inputs on the stereo. If you are not up to this, your local electronics shop should be able to do the

(Continued 70)

Part 1: verify existence of a filename

```
  OPEN?,8Ø,.:POKE53281,.
10 INPUT"[clr]FILE NAME";F$
15 [illegible]
20 [illegible]N(F$):IFL<1ORL>16THEN10
25 FORI=0TO4:READTY$(I):NEXT:P$(Ø)="NO"
   :P$(1)="YES"
30 DATA DELETED","SEQUENTIAL","PROGRAM"
   ,"USER","RELATIVE"
  OPEN15,8,15,"I0":OPEN2,8,2,"#"
140 T=18:S=1:TT=18:SS=1
150 PRINT#15,"B-R":2:0:T:S
160 TT=T:SS=S
170 PRINT#15,"B-P":2:0
180 GET#2,X$:IFX$=""THENX$=CHR$(0)
190 T=ASC(X$)
200 GET#2,X$:IFX$=""THENX$=CHR$(0)
210 S=ASC(X$)
220 PRINT"[home7down]TRACK: "TT
    "SECTOR: [3delete]"SS
  PRINT"[home8down][12 spaces]"
  FORI=0TO7:PRINT"[home5down]ENTRY "
    I+1
  PRINT#15,"B-P":2:I*32+2
  GET#2,X$:IFX$=""THENX$=CHR$(0)
260 PRINT#15,"B-P":2:I*32+5
  FF$=""
  FORJ=0TO15:PRINT"[home7down]
    CHAR MATCH [3delete]"J
  GET#2,B$:IFB$=""THENB$=CHR$(0)
  [illegible]
  [illegible]
  FF$=FF$+B$
  [illegible]
  [illegible]
  PRINT"[home9down]"CHR$(34)CHR$(20)FF$
  IFF$=F$THENFOUND=1:GOTO370
340 NEXT I
350 IFT<>0THEN150
360 IFFO=0THENPRINT"[clr]"F$" NOT FOUND
    ":LO=0:GOTO495
  PRINT"[clr]"CHR$(34)F$CHR$(34)" FOU
    ND":LO=1
```

Part 2: select

```
420 PRINT"[down]LOCATION : TRACK"TT
    "SECTOR"SS" ENTRY"I+1
  [illegible] GET FILE TYPE
  [illegible]AND63:PR=FAND64
  [illegible] FIND STATUS OF BITS 6 & 7
  [illegible]THENB=1
  PRINT"[down]TYPE : "TY$(TY)
  PRINT"[down]PROTECTED: "P$(B)
  PRINT"[down]OPTIONS":PRINT"--------"
  PRINT"[down]1.SCRATCH FILE"
  PRINT"[down]2.UNSCRATCH FILE"
  PRINT"[down]3.PROTECT FILE"
  PRINT"[down]4.UNPROTECT FILE"
540 PRINT"[down]5.FIND NEW FILE"
550 PRINT"[down]6.QUIT"
560 GETA$:IFA$=""THEN560
565 V=VAL(A$):IFV<1ORV>6THEN560
570 ONVGOSUB600,650,700,750,800,850
580 CLOSE2:CLOSE15:RUN

950 PRINT#15,"B-P":2:I*32+2
960 GET#2,A$:IFA$=""THENA$=CHR$(0)
970 F=ASC(A$):RETURN
```

Part 3:manipulative routines

```
600 GOSUB750
605 PRINT"SCRATCH "F$
610 PRINT#15,"B-P":2:I*32+2
620 PRINT#2,CHR$(0);
630 PRINT#15,"B-P":2:0
640 PRINT#15,"U2":2:0:TT:SS
645 RETURN

650 PRINT"[clr]UNSCRATCH "F$" AS :"
660 PRINT"[down]1.SEQ  2.PRG  3.USR  4.
    REL"
665 GETA$:IFA$=""THEN665
670 TY=VAL(A$)+128:REM SET BIT 7 ON
675 PRINT#15,"B-P":2:I*32+2
680 PRINT#2,CHR$(TY);
685 PRINT#15,"B-P";2;0
690 PRINT#15,"U2":2;0;TT:SS
695 RETURN

700 PRINT"[clr]PROTECT "F$
705 REM SET BIT 6 ON
710 PRINT#15,"B-P":2:I*32+2
720 TY=F OR64:PRINT#2,CHR$(TY);
730 PRINT#15,"B-P":2:0
740 PRINT#15,"U2":2:0:TT:SS
745 RETURN

750 PRINT"[clr]"
760 PRINT"UNPROTECT "F$"[down]"
765 REM SET BIT 6 OFF
770 PRINT#15,"B-P";2;I*32+2
775 TY=(FAND191):PRINT#2,CHR$(TY);
780 PRINT#15,"B-P":2;0
790 PRINT#15,"U2";2;0;TT;SS
795 RETURN

800 RUN

850 CLOSE2:CLOSE15:END
```

Table 1: byte 0 is byte 2,34,66 etc of sector

Byte 0	File type
1,2	Address of first data block
3-18	Filename
19,20	REL information
21	"
22-25	Unused
26,27	@: information
28,29	Number of blocks in file

Table 2

File type	SEQ	PRG	USR	REL	
Normally	$81	82	83	84	(bit7=1)
Protected	$C1	C2	C3	C4	(bit6 1)
Scratched	$00	00	00	00	
Unclosed	$01	02	03	04	

ALL ABOUT CP/M

Microcal's CP/M tutorial for the Commodore 128, reviewed by Andrew Mitchell.

New to CP/M? then this is probably for you.

A set of three disks and tutorial manual will take you through the CP/M system from the very basics, to checking and changing file attributes. The tutorial manual says it will provide "a high level view" but will not "of necessity cover every aspect". Considering the scope of the subject, that's a fair comment in my opinion.

The tutorial programme starts by explaining how it itself works, and you are given opportunities to try out the various options that appear at the bottom of each screen page. These options differ according to what you are doing, and where you are in the programme. They include:

- Continue: carry on to the next screen page;
- Recap: go back and revise something you've already covered; and
- Help: get further information on the topic under study.

You are asked to register when you enter the programme, and for a first time user, a registration number is issued. You must always sign on with the same name and number if you want to return to the place you left during a previous session. If you don't the programme will just presume you are a first time user.

As mentioned, you can return to the place you had reached in the tutorial, or you can choose to take any of the various modules within the

course, in random order. This can be handy if you want to learn about a particular part of the system in order to get a job done. You can still return to your previous place at a later date even if you use this option.

The modules within the course are:
A: using the tutorial system;
B: the operating system;
C: files and directories:
D: simple file operations;
E: file copying operations;
F: check file and disk status;
G: system functions;
H: additional facilities; and
I: hints and tips.

These headings are from tutorial syllabus and give a good indication of the topics covered. I found that each of the topics was covered very well in the tutorial, and the extra 'help' pages gave an even greater depth with detailed examples. Just a suggestion here: take plenty of notes, as the tutorial booklet is only a guide to the system, not a textbook of what the programme contains.

And just one word of warning: if you thought your 1541 was slow, your worst nightmares are confirmed in CP/M mode. It's not this particular programme, but all CP/M files load VERY slowly on a 1541. If you get serious about this mode you'll want to invest in a 1571, not only for its speed but also for its ability to read other than Commodore formatted discs. I've tried one and it's magic.

Overall, I think this set of three disks and booklet is certainly value for the CP/M beginner. You can learn all about the system at your own pace, and always have it there to refresh your memory and remind you of the more sophisticated commands available.

Review copy made available by Commodore Computer (NZ) Ltd.

Cirkits and Ski Jumps

by Craig Beaumont

The Cirkit modem I mentioned last month has proved to be a very interesting peripheral. It has two main components: the interface which plugs into the expansion port; and the acoustic coupler which links to the handset of the old style phones.

The interface is described as a minimal parts serial interface to allow the Cirkit modem to communicate with Amstrad CPC computers. It is a little black box smaller than a cassette case, and unlike most Amstrad peripherals it lies flat rather than vertically against the back of the computer. It contains an 8251 UART supported by four ICs. From its top sprouts a one-metre cord with a five-pin DIN plug on the other end which connects to the acoustic coupler. An edge connector out the back is for other RS232 devices.

The acoustic coupler is two plastic boxes joined by a rubber linkage. Each box has a rubber and foam cup for coupling with the ear and mouth pieces of the phone handset. It is powered by four AA size batteries that are supposed to last 50 operating hours. There is a jack to connect an earphone to, so calls can be monitored – very useful if you call the wrong number and are wondering what all the rubbish on your screen is.

This may all sound like some sort of cheap jury rig – which is basically true. What makes it all practical is the robust and well documented software written by Honeywell that is part of the package. The Prestel software works well, although I haven't seen it operating in colour yet. It lacks a down-loading option, but this may be included in future upgrades. Also included is terminal software that you can customise to suit the requirements of whoever/whatever you want to communicate with – by changing the number of bits per character, the stop bits, parity checking, and that sort of thing.

Just a few niggles, though, that you may find warrant purchasing a more standard package, of the type that connects directly to the phone through a BT jackpoint. The cord between the modem and interface is quite short, but luckily my computer is only a couple of metres from a phone. Also the acoustic coupler does not allow use of 300/300 baud rate (commonly used by bulletin boards),as it has only 1200/1200 and 1200/75 baud rates.

I've had no problems with external noise interfering with modem operation – even with a radio going nearby. On the whole I'm happy with this cheap (if nasty) step into the world of computer communications.

CP/M is starting to be useful for more than just managing disk space and running commercial software like Turbo Pascal. After a good deal of work, members of the Amstrad User Group (Wellington) have managed to transfer public domain CP/M software from the local Osborne User Group's library on to 3-inch disks. The first release of this software into our own library included many disk utilities, such as COBOL, Forth and what appears to be a very good version of Colossal Caves. This is only a sample of the large amount of quality public domain CP/M.

Winter Olympics

The Computer Experience supplied a review copy of Winter Games by Epyx, a simulation of seven events from the next Winter Olympics to be held in Calgary, Canada. The events are Figure, Free and Speed Skating; Hot Dog Aerials; Ski Jumping; the Biathlon; and the Bobsled.

The disk version is spread over both sides of a disk, and includes an opening ceremony not found on the tape version. At the last User Group meeting we had a sound demonstration where output from the stereo jack was put through an amplifier. The fanfare in the opening ceremony was very effective at that volume.

The two main playing modes are practice and competition. Practice allows you to try to improve your performance in one event. Competition mode lets you and up to three other players battle for the various medals, and perhaps set new world records, which are saved as in Sorcery +.

I didn't find any of the skating events particularly interesting, although it's very funny when you make the skater fall over. The idea is to perform a variety of movements with maximum grace. In Free Skating you try to choreograph your jumps and spins to music, which requires much practice.

Hot Dog Aerials is a demonstration sport where you perform combinations of flips and stunts before you land, earning points for style and difficulty. The Ski Jump is a matter of maintaining the correct body position during flight. By keeping your skis and legs straight, and leaning forward over your skis at the right angle, you maximise distance and style points.

The Biathlon is my favourite event – partly because of the scenery passed through while doing it. It involves cross-country skiing between four sets of rifle shooting targets. There are three types of terrain – level, uphill and downhill – each requiring different skiing techniques. The aim is to complete the course in the lowest time while missing as few targets as possible. The catch is that the faster you go, the faster your heart beats, which increases the difficulty of hitting the targets.

Bobsledding is a test of reactions and course memory as you seek to minimise your time down the icy track. A game like Winter Games where people can compete against each other and have a lot of fun makes computing a much more sociable pastime.

The prices on the whole Amstrad range went up in early in July. This is a rare event in the microcomputer market, and is understood to be the result of the movement of the yen, but it could discourage potential Amstrad buyers, a situation to the detriment of present owners.

If its news. . . . . call John King, Ph: 796-775

Bit-mapped graphics menus

by Pip Forer

This month something for Masters users and something for all BBC programmers. Firstly, a quick review of the reference manuals for the Master 128, then an update on the bar menu routine published a year or so ago.

One of the criticisms of the Master series has been the need to buy additional documentation in order to be able to make the most of the machine. Three technical manuals (plus View and Viewsheet guides) are to be made available for users. To date the first two have been published, but are not yet widely available. For those who have not seen them, here is the background.

Both are roughly the same size (about that of the original BBC users guide), with chapters designated A-U through the two volumes. Both are thorough and only occasionally cryptic, and cover the arcane as well as *things which* should have been available in a more widely available and cheaper form (such as how to use new OS and graphics calls).

Volume 1 is the more directly technical. It deals with all aspects of the MOS, memory usage, hardware and the various filing systems (also the VDU driver, which may directly concern the BASIC user). Volume 2 is more about the higher levels of the system: four chapters on BASIC, three on assembler and then the missing information on how the editor and terminal functions work. The editor section is comprehensive, and while not friendly to the novice, the editor is certainly quite powerful and flexible. The terminal section is not well written if you want to use it rather than understand it.

All that may help decide whether one volume is more useful to you than another. In brief, if you liked the Advanced Users' Guide you'll be quite at home with this.

A while ago this column gave a listing for a bar menu procedure for use with the teletext mode 7. (A list of options is displayed as a vertical list on one part of the screen. One choice is selected by moving a highlighting bar across the options with the arrow keys and striking RETURN when the choice is selected.) This procedure has been useful to several readers but is handicapped where one wants to use a graphics mode (or develop pull-down menus, which on the Master is not too difficult). However, bar menus can still be easily produced in other modes, but other strategies to the teletext one must be used.

In mode 7 one uses the 'background colour' character (157) to create a highlight on a given line. Three options that produce an equivalent effect to this come to mind. Two use PLOT statements and one uses CLG, all of which must be synchronised to the graphics position on the screen of the text list of options. The general problem has two steps:

- Derive the graphics location for the bar. Using the notation of the teletext program (with TP% lines of text unused at the top of the screen and ttext% being the line position of the highlighted choice within the list), the position of any option is at screen line ttext%+TP%. Since graphics coordinates number up the screen and text lines number down it, this converts into the Y position 1024-32*(ttext%+TP%) for the top of the text line. The bottom of the line is 32 points lower down. Depending on the position and length of the text, we can set Xmin and Xmax as the horizontal locations of the start and end of our selection bar.
- Induce (or remove) a choice bar. We want to inverse the line of text. The first thought that might occur is to use CODE 86, a triangle fill using complementary colours. Two triangle fills would make the rectangular bar. Using the complementary option would flip black to white (or red to yellow or whatever) and the next flip would restore order again. PROCflip with lines 10999 on does this. You could try it. It is fast but has one marked fault. In two corners and on one or two of the pixels along the borders of the triangles some points fail to flip... or rather they flip twice due to overlap of the triangles.

```
10999 DEFPROCflip:Xmax=550:
  Xmin=150
11005 pos%=1024-32*(ttext%+TP%)
  :pos1%=pos%-32
11006 MOVEXmax,pos1%
11010 MOVE Xmax,pos%
11020 PLOT 86,Xmin,pos1%
11030 PLOT 86,Xmax,pos%
11040 ENDPROC
```

The next possibility is to draw a series of horizontal lines from Xmax to Xmin using the complementary (EOR) plot. This can guarantee a flawless choice bar. It is rather slow but has a certain unhurried and pleasing dignity that can be used to effect. To action this, path lines 11006-11030 are removed and replaced by:

```
11006 FOR I=pos1% TO pos% STEP 4
11010 MOVE Xmin,I:PLOT 6,Xmax,I
11020 NEXT I
```

The STEP 4 in line 11006 is to save time, since not every co-ordinate value on the Y axis actually turns on a physical screen pixel.

The fast and perfect solution is to use CLG and a graphics window. The strategy is that Xmax,Xmin,pos% and pos1% together define the desired area of the bar. GCOL 3,131 sets the background colour to logical white with an Exclusive OR (complementary) effect.

When we issue a CLG having established that window, the result is that **only** that window is cleared and the 'clearing' in fact does an EOR of any existing image with logical white. The value of white in all modes is represented by all bits being 1s, so an Exclusive OR with white simply flips any text or graphics in the window. This makes a fast and neat bar, and also has great use for highlighting, and then withdrawing, any area of the screen.

To use this approach simply use these lines between 1106 and 11030:

```
11006 GCOL 3,131
11010 VDU24,Xmin;pos1%;Xmax;
  pos%;
11020 CLG
```

You can set up PROCflip to use either of the two clean methods. The procedure echoes the function of the teletext background statements in the original listing and therefore PROCflip can be inserted neatly to replace the original lines which used the 'background colour' character. We are then left with a procedure suitable for any graphics mode.

The bar menu is an integral part of the widely acclaimed concept of 'pull-down' menus. These menus allow various choice menus to be 'pulled down' on to a screen for choice and then replaced, leaving the screen unchanged after use. We have only looked at the bar menu aspect of this. We may get an insight into the tricks needed to allow the 'pull down' component in another column.

SEQuential data

by Joe Colquitt

After PROGram files, SEQuential files are probably the most often used form of data storage. Games use sequential storage for saving/loading game positions etc, while word processors use SEQ for text files, and others, such as PAINTPIC or BGRAPH, use them for bit-mapped screens. SEQ files are reasonably simple to use from BASIC, but need to be treated differently in ML (you aren't still hoping for an easy topic are you?).

Variables are accessible in ML by the pointer at $47/$48, but at the expense of a lot of fiddly programming and only a minor speed advantage. The BASIC/ML interface is awkward and not really worth the pursuit.

ML SEQuential transfer is much more realistic with blocks of memory. This applies to text and memory dumps, where substantial time-savings can be achieved.

Programs 1a/b show the methods for in/out using SEQ. I found them to run at about 96 per cent of PRG save/load speed. From now on, I'll include the hex values for readers who may want to construct BASIC loaders from the routines, and the arbitrary $C000 start address. As mentioned before, the most efficient transfer of data occurs in block movements, so it's necessary to store data in RAM as a block.

Unlike BASIC programming, separators need not be included for text phrases, but the user program must be able to recognise its own separators (eg Carriage Returns). Dr Evan Lewis in his August article commented on the differences between commercial packages, and the transfer of data between them.

Programs 1a/b are specifically for saving/loading the block of memory $5C00-$7FFF, an area used by several bit-map utilities. $5C00-5FFF is the screen colour area, and $6000-$7FFF is the bit-map area. Note that the $FFD2 could be replaced with $F1CA, and $FFCF with $F157, eliminating 27000 instruction cycles by avoiding the jump table.

BGRAPH and PAINTPIC save pictures in SEQ format (with slight differences in the first few bytes), and others such as DOODLE and PRINTSHOP save PRG files. The conversion between SEQ/PRG means that pictures can be exchanged between utilities, for example using BGRAPH Image files (SEQ) in DOODLE (PRG) and resaving them (SEQ). One advantage of this is that BGRAPH has a centred print, whereas DOODLE prints starting at the left margin.

To find recognition codes in a file, you could use Program 2. It's slow, but allows you to see the sequence of bytes in a SEQ file. Allowances can be made for header codes when manipulating the file. For example, BGRAPH has a sequence like 32 49/32 13 32 49 32 13 at the beginning of Image files that must be catered for if a PRG file is converted to an Image file. PAINTPIC starts files with a 'P' or 'B' and so on.

Word-processors (EasyScript, SpeedScript) save text stored in memory as a large block, treated exactly the same way as a picture block. The bytes are POKED/PEEKED in/out of memory and it is then left to the main program to decipher the special codes and formats. EasyScript, for example, uses no header code, CHR$(13) for line returns, and prefixes reverse characters with 128.

A BASIC program that is saved as a SEQ file is stripped of line pointers and line-terminal zeros. The zeros are replaced with CHR$(13). If you haven't done it before, a BASIC program is converted to a SEQ disk file by:

OPEN8,8,8,"0:name,S,W":CMD8:LIST

PRINT#8:CLOSE8

The resultant file can be loaded into a word-processor.

An outstanding feature of SEQ files is that each and every byte transferred is able to be trapped and worked on. Program 3 is one I've concocted to crunch bit-map saves, and uncrunch them on loading. 'Crunch' is a bit of a misnomer, as the file saved may actually be larger than 8K.

The routine works through the picture, counting consecutive bytes with the same value. It then saves three bytes to the file – Value, Count (lo), Count (hi) – and moves on to the next value, so if the top line was empty, instead of saving 40*8 0s, only the three bytes 0,64,1 would be saved, reducing disk use by 317 bytes. When the file is loaded, the value of the first byte is written into the number of bytes specified by the next two.

In the best possible case, a bit-map screen full of the same value, a total file length of three bytes is saved. For the worst case, a bit-map screen with no consecutive bytes having the same value (what a mess!), a file length of 24K is saved.

Using the crunch routine is a bit swings and roundabouts. Some pictures will crunch very well, with a drastic reduction in disk space used and transfer time, while others will use more disk space. Whatever the case, loading via SEQ means that bytes can be relocated very easily. 'Crunch' should be out of the way at $C000, but you will be able to move it or change 'save' areas with a monitor. If you are calling it from BASIC, you can add your own lines for getting the filenames and installing them at $C000. Change the 8s in lines 205/235 to 1s for tape.

If you would like a copy of the monitor 'Supermon' with instructions, send me a disk, or a tape with a sample save, to 6 Martin Ave, Mt Albert, Auckland.

Program 1a:OPEN2,8,2,"PIC,S,W"

```
Data

C000 50 49 43 2C 53 2C 57 00 'PIC,S,W
C008 00 00 00 00 00 00 00 00

C010 A9 02     LDA#$02   ;set 2,8,2
C012 A8        TAY       ;
C013 A2 08     LDX#$08   ;8=disk
C015 20 BA FF  JSR$FFBA  ;
C018 A9 07     LDA#$07   ;len PIC,S,W
C01A A2 00     LDX#$00   ;at $C000
C01C A0 C0     LDY#$C0   ;
C01E 20 BD FF  JSR$FFBD  ;
C021 20 C0 FF  JSR$FFC0  ;OPEN
C024 A2 02     LDX#$02   ;open line out
C026 20 C9 FF  JSR$FFC9  ;
C029 A9 00     LDA#$00   ;set start to
C02B 85 F8     STA$F8    ;$5C00
C02D A9 5C     LDA#$5C   ;
C02F 85 F9     STA$F9    ;
C031 A0 00     LDY#$00   ;
C033 B1 F8     LDA($F8),Y;
C035 20 D2 FF  JSR$FFD2  ;print to disk
C038 C8        INY       ;loop 256 bytes
C039 D0 F8     BNE$C033  ;
C03B E6 F9     INC$F9    ;inc address hi
C03D A5 F9     LDA$F9    ;
C03F C9 80     CMP#$80   ;>$8000 ?
C041 D0 F0     BNE$C033  ;
C043 A9 02     LDA#$02   ;CLOSE2
C045 20 C3 FF  JSR$FFC3  ;
C048 20 CC FF  JSR$FFCC  ;set default
C04B 60        RTS       ;
```

Program 1b:OPEN2,8,2,"PIC,S,R"

```
Data

C000 50 49 43 2C 53 2C 52 00 'PIC,S,R
C008 00 00 00 00 00 00 00 00

C010 to C024 as above

C026 20 C6 FF  JSR$FFC6  ;open line in
C029 A9 00     LDA#$00   ;set receive
C02B 85 F8     STA$F8    ;address
C02D A9 5C     LDA#$5C   ;
C02F 85 F9     STA$F9    ;
C031 A0 00     LDY#$00   ;
C033 20 CF FF  JSR$FFCF  ;get byte
C036 91 F8     STA($F8),Y;put it away

C038 to C04B as above
```

Program 2:view bytes

```
10 OPEN2,8,2,"name,S,R"
20 GET#2,A$:IFA$=""THENA$=CHR$(0)
30 PRINTI;ASC(A$);CHR$(34)A$
40 IFST=0THENI=I+1:GOTO20
50 CLOSE2
```

(Continued 62)

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Program 3:crunch/uncrunch

```
10 REM CRUNCH BIT MAP SCREEN AT 8192
20 REM LOAD-SYS49168, SAVE-SYS49260
30 REM FILENAME + ,S,R OR ,S,W AT #C000
40 REM FILE LENGTH IN 49177 AND 49269
100 B=49152:FORI=0TO205:READML$
105 IFLEFT$(ML$,1)="X"THENI=I-1:GOTO115
110 A=VAL(ML$):POKEB+I,A:CK=CK+A:GOTO125
115 C=VAL(RIGHT$(ML$,5))
120 IFC<>CKTHENPRINT"ERROR",ML$,A:END
125 NEXT:END
200 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
    ,X0000
205 DATA169,2,168,162,8,32,186,255,169,
    10,162,0,160,192,32,189,X01896
210 DATA255,32,192,255,162,2,32,198,255
    ,169,0,133,248,169,32,133,X04163
215 DATA249,160,0,162,2,32,87,241,157
    ,250,0,202,16,247,165,250,X06383
220 DATA145,248,230,248,165,248,208,8,
    230,249,165,249,201,64,16,19,X09076
225 DATA198,251,165,251,208,232,165,252
    ,240,215,198,252,165,252,48,209,X12377
230 DATA76,62,192,169,2,32,195,255,32,
    204,255,96,169,2,168,162,X14448
235 DATA8,32,186,255,169,10,162,0,160,
    192,32,189,255,32,192,255,X16577
240 DATA162,2,32,201,255,169,0,133,248,
    169,32,133,249,160,0,169,X18691
245 DATA1,133,251,169,0,133,252,177,248
    ,133,250,200,208,8,230,249,X21333
250 DATA165,249,201,64,16,31,177,248,56
    ,229,250,208,10,230,251,165,X23883
255 DATA251,208,232,230,252,208,228,162
    ,2,189,250,0,32,202,241,202,X26772
260 DATA16,247,76,143,192,169,2,32,195,
    255,32,204,255,96,X28686
```

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Q + A

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An interesting alternative is to use a stereo synthesiser. This is a small box of electronics that splits the signal into two, sending a slightly different signal to each channel. This introduces some spatial spread to the sound, which is a lot more pleasing than the point source effect of a mono signal.

Unfortunately these great little devices are not too common, but for those with some electronics ability I believe a good cheap kitset is available from Dick Smith stores.

A stereo synthesiser is also useful for other mono signals you may wish to patch to your stereo, such as from a mono VCR for instance.

Subject: SHELL
System: IBM PC

[Q] What is SHELL used for? All I ever get is a "File not found" error.

[A] SHELL is used to access DOS from within a Basic program.

100 SHELL

Will dump you straight into DOS; the user must type EXIT to continue the Basic program. More useful is:

100 SHELL A$

Where A$ is any legal DOS command such as "B:" to switch to disk B, or "DIR A:" to display a directory of disk A.

There are two catches, you must have a copy of COMMAND. COM on the disk in drive A when SHELL is executed, and you cannot use SHELL to boot Basic.

The "File not found" error is a sure sign that COMMAND.COM is not present.

One other problem with SHELL is the way it handles the screen; in most cases it is best to clear the screen before and after using SHELL.

SHELL is available from IBM disk Basic version 2.0 and higher, although it was only documented from version 3.0.

The uses of SHELL are only limited by your imagination.

You can use it to execute single commands, batch files, or even run another program, although there will naturally be less memory for this sort of thing.

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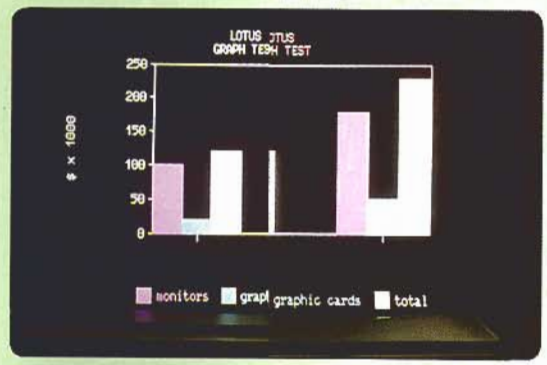

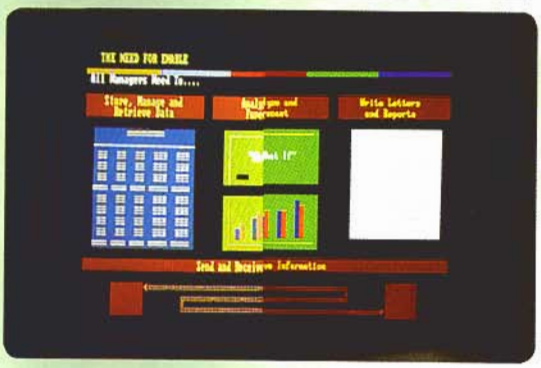

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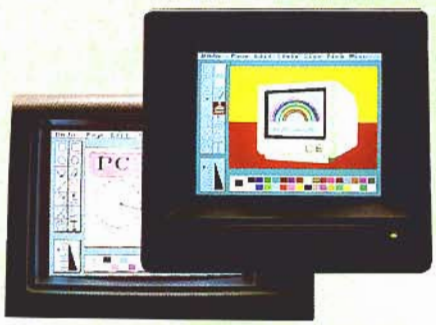

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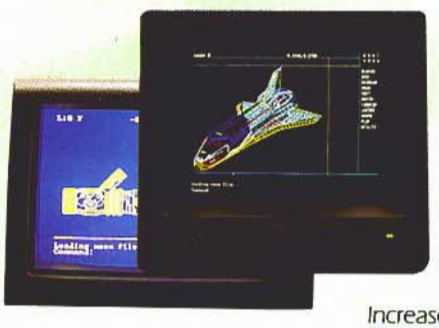

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